eISSN : 2287-4577
pISSN : 2287-9099
http://www.jistap.org
Vol. 10 No. 2 June 30, 2022

Journal of Information Science Theory and Practice

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JISTaP

Vol. 10 | No. 2 | June 30, 2022

KISTI www.kisti.re.kr

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JISTaP
Journal of Information Science Theory and Practice

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Scopus LISA DOAJ DIRECTORY OF OPEN ACCESS JOURNALS Crossref Cited-by 한국학술지인용색인 Korea Citation Index

Publisher

Korea Institute of Science and Technology Information
66, Hoegi-ro, Dongdaemun-gu, Seoul, Republic of Korea
(T) +82-2-3299-6105
(F) +82-2-3299-6067
E-mail: jistap@kisti.re.kr
URL: http://www.jistap.org

Managing Editor: Seonhee Lee, Eungi Kim

Copy Editor: Ken Eckert

Design & Printing Company: MEDrang Inc.

2nd Floor, Hyoryeong Building, 32 Mugyo-ro, Jung-gu, Seoul 04521, Korea
(T) +82-2-325-2093
(F) +82-2-325-2095
E-mail: info@medrang.co.kr
Homepage: www.medrang.co.kr

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Journal of Information Science Theory and Practice

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JISTaP
Journal of Information Science Theory and Practice

Table of Contents

Vol. 10 No. 2 June 30, 2022
Journal of Information Science Theory and Practice • http://www.jistap.org

Articles

JISTaP http://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 10(2): 1-16, 2022

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2022.10.2.1

News Consumption and Behavior of Young Adults and the Issue of Fake News

Zeinab Nazari*
Information Technology and Learning, University of Gothenburg, Gothenburg, Sweden
E-mail: nazarizn66@gmail.com

Mozhgan Oruji
Information Science and Epistemology, Islamic Azad University, Science and Research Branch, Tehran, Iran
E-mail: orojim@yahoo.com

Hamid R. Jamali
School of Information and Communication Studies, Charles Sturt University, Wagga Wagga, Australia
E-mail: h.jamali@gmail.com

ABSTRACT

This study aimed to understand young adults' attitudes concerning news and news resources they consumed, and how they encounter the fake news phenomenon. A qualitative approach was used with semi-structured interviews with 41 young adults (aged 20-30) in Tehran, Iran. Findings revealed that about half of the participants favored social media, and a smaller group used traditional media and only a few maintained that traditional and modern media should be used together. News quality was considered to be lower on social media than in traditional news sources. Furthermore, young adults usually followed the news related to the issues which had impact on their daily life, and they typically tended to share news. To detect fake news, they checked several media to compare the information; and profiteering and attracting audiences' attention were the most important reasons for the existence of fake news. This is the first qualitative study for understanding news consumption behavior of young adults in a politicized society.

Keywords: news consumption, fake news, news behavior, young adults

Received: December 17, 2021 **Revised:** February 26, 2022
Accepted: March 5, 2022 **Published:** June 30, 2022

***Corresponding Author:** Zeinab Nazari
https://orcid.org/0000-0002-0271-9487
E-mail: nazarizn66@gmail.com

1. INTRODUCTION

In the past, people could receive news via radio, television, newspaper, magazines, and acquaintances (in person); whilst today, social media play a significant role for many people in terms of local, national, and international news (Oltmann et al., 2018). While social media have helped the speed and spread of news dissemination and have facilitated people's contribution to content, this has also contributed to the fake news phenomenon. Because of the convenient access to different topics in the virtual world, the amount of fake news and misinformation has increased. People tend to accept information that is supportive of their feelings or personal beliefs. This is related to the construction of "filter bubbles" by social media, which means social media with their recommendation and personalization algorithms make people see information that targets their established interests, and therefore people no longer encounter a balanced and healthy information diet (Bruns, 2019b). Filter bubbles mean that users can avoid facing alternative views and reinforce their preconceptions (Rose-Wiles, 2018). Some scholars such as Bruns (2019a) have disputed the concept of filter bubbles; nevertheless, it is vitally important for people to be able to determine the right information.

Despite the long history of fake news, for a few reasons it has attracted more scholarly attention recently. It is now easy to set up websites and publish content and earn money through advertising. Moreover, social media are suitable platforms for fake news dissemination, and the use of social media has seen a dramatic rise (Allcott & Gentzkow, 2017). According to Digital 2022 (Kemp, 2022), Facebook has 2.91 billion users. In Iran, 33.4 million users utilize social media, even though many social media platforms are banned and filtered by the government.

Young adults are an important part of any society and it is important that they are well-informed but also have critical thinking skills for evaluating information. Young adults' interest in news can have an impact on the economics and existence of news organizations and on the quality of journalism (Craft et al., 2016). Recent research (e.g., Esmaeli et al., 2019) has raised concern about Iranian young adults' information literacy with regard to news consumption and fake news. Information literacy is a "set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (Shields, 2005, p. 6). However, there is not sufficient research and information available on how young adults in Iran consume news. Therefore, the aim of this study is to fill this gap and study news consumption behavior and tendencies of young adults. Fake news in this study is not limited to news that is misleading by design, i.e., the cases where false or misleading claims are deliberately presented as news (Gelfert, 2018); instead it is generously defined as news that is perceived as untrue (Kitta, 2018), and therefore it includes both deliberate disinformation and unintentional misinformation. The research answers the following questions:

- What kind of news do young adults usually consume and what kind of news attracts them?
- What sources do young adults use in order to get news?
- What perception do young adults have about fake news and how do they deal with fake news?

1.1. Mass Media in Iran

Iran, in the Middle East, north of the Persian Gulf, has 84.2 million people, half of whom are under 35 years old. Politics severely affects people's daily life, and many aspects of social and private life, from sexual life to religion to youth identity, have been politicized (Khan Mohammadi & Kaveh, 2019). Iran has also been under international and US sanctions for many years that have affected its economy adversely, which is another reason for many people to closely follow the news. The government of Iran controls all of the media. All TV and radio channels are state-owned, and the print media are controlled by a ministry. Most of the well-known social media platforms (e.g., Facebook) are filtered to prevent political protest (Rahbarqazi & Baghban, 2019). In spite of these limitations, social media are heavily used by people who bypass filtering using anti-filter software. For instance, it is estimated that Telegram has about 24 million, WhatsApp 14 million, and Instagram 12 to 14 million Iranian users (Rahbarqazi & Baghban, 2019). There are some news websites and TV and radio channels in the Persian language outside Iran (e.g., BBC Persian, VOA Persian, etc.) that are banned in Iran, but many people watch them using top-of-the-roof satellite receivers.

2. BACKGROUND AND LITERATURE REVIEW

Fake news is a global phenomenon that affects people all over the world. Here, first, a review of news consumption studies is presented to provide some context for this study, and then research related to fake news is reviewed.

 https://doi.org/10.1633/JISTaP.2022.10.2.1

2.1. News Behavior (News Consumption)

There have been studies concerning news consumption and news behavior of people throughout the last decade. Interviews with 61 high school students in the USA by Marchi (2012) revealed that the way they accessed news and their priorities had changed and that teenagers had novel insight into news resources. A survey by Craft et al. (2016) showed that American teenagers got news mostly from social media and their parents, and that teens cared less than adults about news. In fact, age influences news consumption so that it increases as young people mature (Casero-Ripollés, 2012). A more recent survey in the USA also showed that most university students accessed news through social media (Evanson & Sponsel, 2019). In addition, Shearer and Eva Matsa (2018) found that one third of people who used social media for news had a better perception of current affairs. Another study in the USA showed that college students obtained their news from their friends (93%), via social media (89%), and from their educators and professors (70%) (Head et al., 2018). College students have also been found to use smartphones or computers to get online news (Antunovic et al., 2018; Chan-Olmsted et al., 2013). Young adults also inadvertently received news while using smartphones or their computers (Boczkowski et al., 2018). Young Canadians considered social media as a source of news, though it acted more as an encouragement for them to follow mainstream news that they regarded as more trustworthy and believable (Thom, 2016). Malaysian college students also preferred online news, especially entertainment news, and they disliked business and finance news (Freeman, 2013). When college students were asked how they thought that news would be received five years in the future, they predicted that they would rely more on traditional media than social media (Lewis, 2008).

News does not seem to be a priority for university students, especially as they consider media as a place for a wide range of joy and gratification, as Huang (2009) found out. A study of 450 people (15 to 25 years old) in the Netherlands showed that young adults find standard news unattractive and boring (Meijer, 2007). In Sweden, high school students predominantly read hard news (i.e., timely, serious, and consequential news such as politics and business) on traditional media rather than on social media and they considered news from traditional media as more credible (Nygren et al., 2019).

The literature reveals some cultural and national differences among young adults in terms of news consumption. In the UK, while TV is still the most useful news platform for British adults, its use has decreased, and the use of social media has increased. The Internet is the most popular news platform among 16-24 year-olds in the UK (Ofcom, 2019). In Australia, young adults (16-24 years old) regarded television as their main news source and online news as a secondary medium (Lancaster et al., 2012). A study of 18 to 24-year-old college students in the USA revealed that they got their news mostly from the Internet (Jarvis et al., 2009).

A study in China found complementary and converging patterns of media usage in which users utilized multiple media for news, with choices influenced by their interests along with the availability and credibility of sources (Yuan, 2011). Hernández-Serrano et al. (2017) found differences based on age, sex, and educational level in news consumption. They maintained that there is a need for an innovative educational approach to inform citizens so that they can be critical and able to evaluate the media content. However, education needs to be carefully designed and delivered, otherwise it can contribute to the problem, as research by Wineburg et al. (2020) shows that some approaches to teaching digital literacy actually make students susceptible to scammers, rogues, bad actors, and hate-mongers.

And finally, in the case of Iran, which is the subject of this study, there has not been much research regarding young people's news consumption in Iran. The only study seems to be a survey of three generations of Tehran's young adults that showed each new generation consumed less news than previous generations; however, people were usually interested in political news (Amiri & Zabolizadeh, 2018).

2.2. Fake News

Fake news is not a novel phenomenon, and it has existed in the past, too. Allcott and Gentzkow (2017) defined fake news as a false piece of news that deliberately misleads readers. Two significant features in this definition are authenticity and intention. First, fake news includes false information that can be verified. Second, fake news is produced with a dishonest purpose to mislead readers (Shu et al., 2017), particularly when it is separated from the original context or source (Rubin et al., 2015). The spread of fake news has become one of the most important concerns in the twenty-first century. Pennycook and Rand (2017) argued that Facebook engagement (likes, comments, shares) was greater for the most viral fake news stories than for the most viral real ones in the three months leading up to the 2016 US election. In addition,

it was found that false news and information on Twitter spread wider, deeper, and faster than true news stories (Vosoughi et al., 2018).

The extensive dissemination of fake news can have detrimental effects, such as breaking the authenticity balance of the news ecosystem (*ecosystem* here refers to the news environment with all its players such as publishers, consumers, etc.); also it can encourage audiences to accept beliefs which are false or prejudiced, and change readers' interpretation and response to the true news (Shu et al., 2017). According to Vosoughi et al. (2018), political fake news has more effects than other fake news concerning terrorism, natural disasters, science, urban myths, or financial information. Al-Zaman et al. (2020) also found political fake news dominated social media, especially around election periods. Two principal reasons for producing fake news are financial and ideological motives (Tandoc et al., 2018). A news article that goes viral on social media can earn a significant profit when users click on the original site. This seems to be a key incentive for most producers whose identities were revealed (Allcott & Gentzkow, 2017).

Several studies have investigated people's ability to identify fake news. Young adults' ability to detect fake news is positively correlated to their critical evaluation strategies (Leeder, 2019) and their analytical thinking skills (Pennycook & Rand, 2017). Culture also plays a role in the spread and acceptance of fake news distributed via social media (Rampersad & Althiyabi, 2020). The use of social media influences the acceptance of fake news, e.g., those who rely on Facebook as a principal source of news were more likely to rate fake news headlines as accurate (Silverman & Singer-Vine, 2016). Other factors such as biases and cognitive biases can play a role (Behimehr & Jamali, 2020). For instance, research showed that in the 2016 US election, people were much more likely to believe news stories that favored their preferred candidate (Allcott & Gentzhow, 2017).

Detecting fake news is not straightforward and requires education, literacy, and skills. Education for how to evaluate news and how to detect fake news should start from an early age (Loos et al., 2018). It has been suggested that besides teaching information literacy to college students to build critical thinking skills, academics and librarians can also introduce reliable fact-checking websites such as Snopes and HoaxSlayer to combat fake news (Musgrove et al., 2018). Technology has been also used to deal with the fake news problem. Algorithms and software tools have been developed to detect or combat fake news, which are beyond the scope of this paper.

3. METHODOLOGY

This research used a generic qualitative approach (Kahlke, 2014). Generic qualitative approach, also called basic qualitative or simply interpretive approach, which can stand alone as a qualitative approach (Merriam & Tisdell, 2015), is the type of research that is not guided by an explicit or established set of philosophic assumptions in the form of one of the more established qualitative approaches (e.g., phenomenology) (Kahlke, 2014, p. 39). Semi-structured interview was used as the data collection means. Participants (Table 1) were young adults in Tehran, aged 20-30 years old. This age range was chosen as we assumed people in this age range would be more aware of their society and more likely to have interest in news. We limited our participants to people who live in Tehran because of practical reasons such as accessibility to population but also because Tehran, as the capital, is the largest city and includes immigrants from all corners of the country. However, Tehran by no means represents all of Iran and results should not be generalized to the whole country. Participants were selected using a purposive sampling approach with the aim of achieving maximum variability in terms of demographic characteristics within the given age limit. They were recruited through the network of two of the authors on social media, using recruitment posts on social media in general (Telegram Messenger) and through snowball techniques, as some participants

Table 1. Characteristics of participants (n=41)

Characteristic	Category	N	%
Sex	Male	12	29.3
	Female	29	70.7
Marital status	Married	22	53.7
	Single	19	46.3
Occupation	Employed	17	41.5
	Unemployed	15	36.6
	Student	9	21.9
Education level	Diploma	3	7.3
	Associate degree	5	12.2
	Bachelor	19	46.3
	Master	11	26.9
	PhD	3	7.3

 https://doi.org/10.1633/JISTaP.2022.10.2.1

introduced others. No monetary incentive was offered for participation and the participants were ensured about the confidentiality and anonymity of their participation. Their education ranged from diploma to PhD degree, with 46.3% having a bachelor's degree. More than two-thirds (70.7%) of them were women, 43.6% were married, 41.4% and 36.5% were employed and unemployed respectively, and 21.9% were university students. A total of 41 semi-structured interviews were conducted before the researchers felt the new interviews did not include much new information (saturation point) and stopped data collection. Interviews were conducted either face-to-face or by phone during April-June 2020, all of which were recorded and transcribed for the analysis. The appendix shows the interview questions. Thematic analysis (Braun & Clarke, 2006) was used for data analysis. Quotations (translated from Persian to English by the researchers) in the results section include a fictional name, sex (F for female and M for male), and age of interviewees to provide some context.

4. RESULTS

The Internet and social media have had a big influence on news consumption. However, different age groups might have different news consumption behaviors, as their needs and interests may be different. Interviews with Tehran's young adults showed that about half of the interviewees (19 people) did not regularly follow the news. Their reasons for not following the news included lack of interest, distrust in media, feeling distressed as a result of sad news, and lack of time. For instance, Golnaz (F, 28) said "I don't follow the news because it makes me nervous and affects me directly and then when I am nervous, I mistreat my child." Maryam (F, 30) stated that "I think media don't reflect the truth and everything is selective, biased, and phony."

However, the remaining (twenty-two) interviewees actively consumed news. They mostly followed scientific, artistic, political, and financial news. They were also interested in issues related to the environment, celebrities, technology, and culture. These choices were based on issues that they felt would have an impact on their daily life (especially politics and finance). Reading the news also helped them to escape from the pressures of life and be entertained (e.g., by reading about celebrities). They usually spent between 15 minutes and two hours per day reading news. One of the respondents (Morteza, M, 30) was an outlier as he spent around four to five hours each day following news, mostly watching news on television. Being unemployed might have contributed to the amount of time he spent on following news.

In the current study, news media were divided into two categories, traditional and modern. Traditional news sources included television, radio, newspapers, and magazines. Most modern media consist of social media and websites. Choosing a medium begins with the social and psychological origins of one's needs. As Zerba (2011) pointed out, beliefs, expectations, values, requirements, daily routines, and sociocultural factors can affect a person's choice of news medium. Studies in the past (e.g., Marchi, 2012) have found that most young adults under 30 do not subscribe to newspapers, television, or radio channels.

The interviewees in this study were divided into three groups, those who used modern media more than conventional media, those who favored the traditional media, and those who believed that both media types should be used. One of the reasons for those (20 people) who had a tendency towards modern media was their perception of the credibility of news sources. They believed that modern sources, including Instagram and websites, are more trustworthy than conventional ones. They also mentioned that modern media are more accessible, ubiquitous, and less controlled in that users can review them and have more freedom for expressing themselves. This should be understood in the Iranian context, as official media (TV, radio, and print media) are either state-owned or strictly controlled by the Iranian government and might serve as propaganda channels for the political regime. On the other hand, advocates of traditional media (16 people) believed that television is more reliable because it is known as a trusted source and is the first news source for most people, especially less literate or illiterate ones. The rest of the interviewees maintained that both traditional and modern media should be used together since they can complement each other. They also felt the necessity to evaluate and investigate information from both kinds of media to have a better picture of the events.

> According to Yalda (F, 30), "nowadays social media are used more and more and they have a higher position than traditional sources, but we should check the accuracy of media content because news may be fake."

> In contrast, Leila, (F, 30) said "to me, traditional media like radio, TV, and satellite channels give more accurate news to people; they are more reliable than social net-

works such as Telegram and Instagram."

4.1. Traditional News Resources

4.1.1. Television (National and International Channels)

Amongst participants in our research, some young adults who utilized television as a main news source (15 people) believed it to be more reliable than other sources, and therefore they get their news only from television. The others did not trust television due to tendentious programming and the tendency to support authorities.

> "TV is a widespread medium and it's reliable, but satellite TV channels follow only their goals in drawing audiences' attention." (Hussein Ali, M, 25)

> "I think TV has credibility because it's national media." (Sahra, F, 25)

> "They don't tell the whole story or all of the details of news stories and just focus on the parts they favor, and there is a lot of censorship." (Ashkan, M, 20)

Interviewees who preferred to use satellite channels highlighted the point that each channel is different from the others and that international channels are better than domestic channels.

> Atena (F, 24) explained that "some channels like BBC Persian tell the news as an impartial source but some others like VOA [Voice of America, Persian] is completely biased against Iran and this is obvious through their news, and this animosity makes them tell maybe false news, and all in all we can't say how much it is reliable, and channels differ from each other."

> "We can trust some news and information which we usually watch on satellite channels... Maybe just they aren't consistent with our religious opinion." (Leila, F, 30)

> "I'm not a fan of those [satellite] channels, because they blame our country for everything and it makes me nervous because I live here. But they may be more credible than local channels due to their reports which are sent by ordinary people." (Golnaz, F, 28)

Furthermore, several interviewees declared that domestic and satellite channels should be used together because they complement each other, and stated that people should evaluate the news to find the truth. For example, Sara (F, 24) said: "both kinds of channels have their own bias which means it's better to watch both and find their similarities and finally you yourself should distinguish which is correct."

4.1.2. Radio, Newspapers, and Journals

Some of the participants (11 people) believed that radio has more specific and smaller groups of audiences, and therefore is more honest and daring when it comes to telling the news. Nevertheless, they thought that radio was not suitable for news because it lacks visuals that reduce its influence. For this reason, they use it just for entertainment.

> According to Mehraveh (F, 28), "Radio has few controversies due to fewer audiences but maybe it is less effective due to the lack of visuals."

> "Perhaps the radio isn't useful enough nowadays, and people usually get their news through other media." (Mansour, M, 25)

Previous studies have mentioned that young people are usually not interested in reading print media (newspapers and magazines) for a few reasons, including time limitations, the availability of other news media, the price of newspapers, lack of interest, the physical format of the printed newspaper (i.e., not being multimedia), their perception that the print media are biased, and difficulties with understanding news stories in newspapers (Jarvis et al., 2009; Zerba, 2008; 2011). Although this study was in line with some past studies, print media were not used extensively by the participants as some respondents used different types of newspapers and magazines. They considered most newspapers as biased towards their own political side. They also thought that yellow press (i.e., yellow journalism) had low-quality contents. Only a popular science magazine was considered to have considerable credibility because of its specific audience and professional content. Tina (F, 26) added that this is so of newspapers and magazines "because they are written and are similar to formal documents so they are more reliable than TV."

> "I think they [newspapers] have more freedom to express opinions but some of them like Keyhan uses strange and weird headlines as it seems to want to per-

 https://doi.org/10.1633/JISTaP.2022.10.2.1

suade people to fight each other and it's just for certain people so that I can't trust it." (Samareh, F, 20)

4.2. Modern News Resources

4.2.1. Social Media

Social media has become the most important news resource for young adults (Leeder, 2019) whereas older people prefer printed news media (Hernández-Serrano et al., 2017). According to the Pew Center's report, Facebook was still the most popular social network for news in 2018 followed by YouTube and Twitter (Shearer & Eva Matsa, 2018). Similarly, in this study social media was popular among the participants.

Instagram and Telegram were the most popular social network platforms among participants (mentioned by 24 participants) for news consumption. One reason might be that other social media, such as Facebook and YouTube, are filtered by the Iranian government. Participants mentioned several reasons for their choice, including accessibility, spending a long time using social media channels for other reasons (e.g., communicating with friends), the diversity of information available, disliking watching television, speed of transmission, currency of news, the ability to connect with others on social media, and more realistic information on social media.

"I use mostly Instagram and less Telegram because there is a huge number of photos and texts and also a variety of information, and I spend all day on Instagram so it is the most up to date place for me." (Sara, F, 24)

"I prefer to use social networks because I don't watch TV but I can always get news by social media no matter where I am." (Elaheh, F, 25)

Although Tehran's young adults used social media as a news source, they did not necessarily consider it trustworthy. They believed that the type of Instagram page (e.g., celebrity, professional, or governmental) and news can affect the evaluation of social media credibility. They also believed that because ordinary people are the source of news on social media, it could be either true or fake. Another reason for distrusting social media was that almost all social media posts eventually seek to attract audiences and might, therefore, share news that is exaggerated or superficial.

Marjan (F, 26) explained that: "I can trust just pages that belong to scientists or professional people or institutes. Sometimes, they [pages] post strange and weird things to attract audiences. In the case of Telegram, I think we can't trust it much because they are highly exaggerated."

And according to Ehsan (M, 27), "Instagram is not a news source and almost all the pages are personal pages, and at last, belong to companies which try to advertise their products... You should be careful what you see or from whom you hear… about Telegram, some channels are biased, too, and some try to earn money, similar to Instagram."

"I can't trust news on Instagram even 10%, because everybody likes to be famous and earn money from that; also everyone can post anything they like." (Shohreh, F, 20)

As far as education is concerned, participants announced that they themselves had not taken any course related to using social media; rather, they learned about possible issues through different pages or by asking people around them.

Marjan (F, 26) reported that "there is a need to educate people, especially teenagers and housewives, and in particular about Instagram because they may face something that they don't know about its source, or the content may be unsound either in terms of accuracy or morality, so a person should be trained to have the ability and morality and also the culture that are needed to use it."

Also, Leila (F, 30) mentioned, "before using everything, there should be education and culture building; definitely it's true about social networks."

4.2.2. Websites

Our findings showed that well-known and reliable websites (e.g., Google news, Zoomit.ir, and YJC.ir) were attractive to young adults. Professional and academic websites were also considered to have appropriate credibility. However, respondents generally thought that websites were not needed because of the existence of social media. Interestingly some young adults also described websites as distributing fake news as much as other media.

"I usually use some apps for my language and they tell me the daily news… for example, Google news app, the website of young correspondents, cinema ticket app, and etc." (Marjan, F, 26)

Regarding websites, Reza (M, 25) also said "I use mostly trustworthy and professional websites, such as Astronomy, Zoomit.ir, and NASA websites."

But Ashkan (M, 20) stated, "to me, websites are the biggest liars; for instance if you searched for the death of one actor whom there is no news about, you would definitely find some websites that she has died."

"People don't use websites a lot, as they use social media..." (Tina, F, 26)

4.3. Fake News

When we asked about the reasons for the existence of fake news, our interviewees believed that the fake producers are engaged in profiteering, drawing an audience's attention, destroying others, exaggerating and distorting the news, abuse, orienting and distracting people to a certain issue, censorship and concealing the truth, creating chaos or pacifying society, and entertainment.

Ali (M, 22) noted, "fake news has a different definition or sometimes a source itself could be fake or there might be a misinterpretation, which may be 90%. Somebody shares a piece of news when it has a benefit for him, and they usually apply their views, but sometimes a medium may share fake news because of the attraction of that fake news or they want to draw readers' attention or perhaps they tend to create chaos in society."

Also, in Yalda's viewpoint (F, 30), "the point is that people often don't think if the news is fake or not and just due to its attraction, they share it; and individuals don't even think about the negative consequences of spreading fake news, either on social media or in the real world."

"There is a lot of fake news; the most important reason is everybody or every group wants to show themselves, some who like to be seen use fake news to get a lot of audience attention, and some others want to impose their belief and then they share fake news to get you to change your mind or to occupy your thoughts." (Reza, M, 25)

4.3.1. Fake News Detection

Detecting fake news is not a straightforward task. Studies have shown that many people who are exposed to fake news believe it. One reason for this is that fake news articles are often published by websites which are intentionally designed to look like reliable news media (Leeder, 2019) and include general topics and issues, such as politics and the economy. Fake news does not follow the ethical codes that professional journalists abide by (Berkowitz & Schwartz, 2016). Repetition of news, i.e., being familiar with a particular news item, can also have an important effect on whether people believe it (Soltanifar et al., 2017).

Similarly, a few of the interviewees of the current study believed that there is no possibility to detect fake news.

Shohreh (F, 20) reported, "because every day there is a lot of new news and if 25 pieces of news out of each thousand were fake news, then tomorrow you can't think which one was fake and then you may hear again thousands of pieces of news. Actually, in reality, that fake news was hidden among a huge amount of news, so it's hard to identify it [fake news]."

Nonetheless, most interviewees employed some techniques to distinguish fake news. These included assessing and comparing it with other sources, educating themselves, and using personal logic and experience. Other factors mentioned included how frequently the news was republished, the news genre, multimedia (films or clips or pictures related to the news), the credibility of the news source and its history, the social atmosphere, the existence of any refutation in a reliable medium, the tone of the reporter, and the absence of personal feeling or bias.

Regarding this, Azadeh (F, 30) expressed what techniques she employed to distinguish fake news: "through a trustworthy medium and referring to a printed version of a reliable outlet; not reading just headlines; if there is a link on the text, checking the link; checking the date of publishing; who is the writer of the news; and Googling."

"The best way to detect fake news is the education of identifying accurate news. This causes people to gradually react to false news and perhaps the market for fake news will disappear. Also, we should always know there is real news against grey news; the more real news stories, the less fake ones." (Atiyeh, F, 24)

 https://doi.org/10.1633/JISTaP.2022.10.2.1

"You just search to find how many times it is re-shared and where those are, and also how much it matches with your logic. Check if it is on ordinary people's pages or famous ones." (Sarah, F, 24)

Furthermore, to find more evidence and evaluate doubtful information, the interviewees utilized different methods, and searching among various sources stood out as the most popular method.

In Marjan's (F, 26) opinion, "if it's an important issue… I wait to see what TV is releasing on it, or check some websites, which are related to government… Also, I usually watch the main news program of TV or the "20:30 News Show," or breaking news programs through the news channel."

Additionally, Ehsan (M, 27) stated that "it depends on the importance of news or how much that news item is biased; whether an issue typically is very significant or trivial, or the tone of news is extremely harsh, or the problem is extremely simple but a writer makes it look significant, then you'd doubt it. I typically check a few different sources that belong to different countries or have different political sides. You yourself should be neutral, then you can realize which one is true and which is wrong."

The second action taken by Tehran's young adults is to ask well-informed individuals. Arash (M, 30) noted, "…it depends on the importance of news. I search for more evidence, searching on the Internet, or asking my professors or well-informed people..."

Respondents mentioned using personal logic and rationale as well. They assessed of the content of news. An example is: "to me, news content is the best evidence for assessment if all aspects are taken into account, and if it's not extravagant, phony, or exaggerated, it can be a little trustful" (Yalda, F, 30). Finally, the extent of news and reading the criticism of articles are the other items that were noted by the interviewees.

4.3.2. Criteria for Distinguishing between True/False News

This study found that the source of news is the most significant criterion for the differentiation of fake news from true news: "A reliable source has a huge effect on the accuracy of the news" (Katayon, F, 30). Other criteria included frequency and repetition, personal logic and experience, and participants' prior knowledge.

Ehsan (M, 27) stated that "prior knowledge of a person is important in understanding a piece of news. If we lack prior knowledge and information needed to properly analyze a piece of news we should be more cautious about it. If we can't analyze, we shouldn't easily believe it."

Other factors mentioned by interviewees were how wide the news spreads, people's reaction, neutrality of outlets, considering all sides of a story, the reporter's tone and his/her position, news genre, objective evidence, asking well-informed individuals, the date of the news release, and whether there is information that disproves the news.

"I check who wrote the news, what the news wants to tell us, when it's released, where it's published, and what I will feel after reading the news." (Leila, F, 30)

"It's important how realistic the context is; its writer or his tone could be helpful, the tone also can show if the reporter seeks to get attention or wants to just tell the news. We should treat the news with caution when somebody speaks in a good tone." (Ali, M, 22)

4.3.3. Education in Relation to Fake News

When it comes to education, media literacy and information literacy are regarded as the most effective skills (Soltanifar et al., 2017). Esmaeli et al. (2019) mentioned that education can be a responsibility of libraries and can be in the form of academic skills courses from primary schools (Hernández-Serrano et al., 2017).

The interviews also revealed the importance of education for detecting fake news. Interviewees emphasized culture-building activities to prevent people from believing everything quickly. Atena (F, 24) noted "it's better to teach people to tell the truth rather than tracing verification." In that case, people will not become a source of fake news. Instead they need to be taught to examine any news.

"This education should be for the public because people mostly are innocent; for example, some workshops or courses could be held in cultural and local institutes… in order for people to become familiar with newsagents, or how they can find a good and accurate news source. Also, those workshops can go with something like introducing some apps because most people use cell phones these days." (Marjan, F, 26)

> "The first thing that should be taught is whatever we read, we shouldn't believe, especially on the Internet or printed newspapers which are published in our country due to the bias they have. The Internet is a double-edged sword, which means it has both good and bad things. And if there is something which is important for people, before any reaction they should search about it not to tell tales." (Ehsan, M, 27)

It is noteworthy that verification is related to the type of news and its importance. Some people who are completely involved with the news or for whom it has a huge effect on their life need more education. According to Zahra (F, 30), "It depends on a person; for example, for me who follows the news just as an ordinary person, it's not worthy, but for another where her life can be impacted a lot by the news, it is necessary."

Education can be provided both directly or indirectly. Some skills, such as critical thinking, information literacy, and media literacy can be taught at universities, schools, and educational centers: "some techniques, signs, and words could be taught to children, in particular at an early age so that children can learn not to follow false news, and when they can detect it, their logic also can be thriving" (Elaheh, F, 25). In contrast, Katayon (F, 30) said that the "educational system in schools is under control of government so it affects children and their learning."

Indirect education could be provided through national media and/or on social media for all walks of life in the form of short or long clips and movies. Such education can help people make better judgements and decisions that will improve society.

> "In the past, education could be provided by movies, but not now, because most people don't watch TV, like us, but Instagram clips or funny videos which most people follow can provide these contents because it goes directly to people's subconscious." (Sarah, F, 24)

> "Education makes people improve in their daily life; for example, how to act in relation to politics is directly related to education, and it's good for improvement in society and future generation." (Sahar, F, 23)

Only a few interviewees had been trained how to detect fake news at university. Others had been taught by their family or by experience not to believe everything or how to assess information and news in a better way.

> Ehsan (M, 27) mentioned, "I didn't have any direct education either in school or at university, but my family and especially my father were always saying I shouldn't believe everything… in particular, about political issues. Since I was a child, I searched on the Internet and then I've gradually seen lies and prejudice, and practically I've learned from my experience, and then I've learned to read from foreign websites."

4.3.4. Sharing and Preventing Fake News from Dissemination

When people read the news, if they find it attractive, they usually share it with others, family, and friends. In most cases, individuals share news for the sake of entertainment and having fun, and ironically most news stories are related to unpleasant events and are ill-intentioned (Al-Zaman et al., 2020; Mercier, 2020). Self-expression and socializing are among the main incentives for people sharing misinformation, while the accuracy and credibility of information are often not considered as significant (Leeder, 2019). A study by Chen et al. (2015) noted that sometimes college students shared misinformation with others because of unawareness, attractive messages, or communication with their friends.

Participants of our study paid attention to the accuracy of news as far as sharing news was concerned. If they are confident something is fake news, they will not share it, or even if they share it, they will inform others if they later realize that it is false. The issue, of course, is that their perception does not necessarily match the reality. They might perceive a piece of news as real when it is fake.

> "If it's a funny story, I'll send it to my friends, but if it's crucial and warning news, I'll try to send it to all to make them aware, and about current affairs, I'll send only if I'm sure that it's true. When I'm not sure, I tell them I've just heard or read it. Rarely did I share fake news, and it wasn't on purpose." (Marjan, F, 26)

> "It depends on the news and for whom I want to send it. Sometimes I check the accuracy, but it happened to me that I shared fake news and when I realized the truth, I also shared the accurate news. I didn't know it was fake news, otherwise I wouldn't have shared it." (Elaheh, F, 25)

Because of their willingness to share news, young adults can contribute to the dissemination of fake news (Leeder, 2019). Consequently, the question of whether or

not the spread of fake news can be prevented comes to light.

On the one hand, our interviewees believed that it is impossible to halt the spread of fake news, in particular when it is released on reliable media or sources. In Arash's (M, 30) point of view, "no, it's not possible. Because we don't have any power to stop it, we can just counter it, which means we can share true news on media." Or according to Elaheh (F, 25), "overall, fake news is common among people, and people themselves gossip."

On the other hand, some claimed that people could be taught not to be the source of fake news and not to share it, and that this can happen by means of culture-building practices. Moreover, the spread of fake news may somewhat be prevented through several measures, including the presence of the information in reliable resources that disproves fake news, reporting the sources of fake news, and the existence of professional reference groups in every field (e.g., scientific or professional associations).

> "Unfortunately, most people think that they all have a task of sharing news, but first of all we are just readers, and after checking about accuracy we're allowed to share it. If our society accepts this manner not to share everything before being assured about the accuracy, we can stop the spread of fake news." (Hussein Ali, M, 25)

> "If there is no customer for something, the seller won't exist. People should be developed mentally and logically, and they should mainly be aware listeners... People should learn how to think correctly." (Ehsan, M, 27)

5. CONCLUSION

The current study used a qualitative approach to understand the news consumption behavior of Tehran's young adults and their attitude towards the fake news phenomenon. The paper is the first to study this topic in an extremely politicized society such as Iranian society. Of course, the findings cannot be generalized to other countries, as political and cultural situations might be different in every country. However, the findings contribute to our general understanding of news consumption among young adults and the way they deal with fake news. Some of the findings of the study are:

- Tehran's young adults preferred social media to receive news, although they perceived the quality of the content of social media to be lower than that of traditional media;
- Even though the government of Iran tries to limit the access to some social media, Tehran's young adults use filtering software to view them;
- Their choice of news content was influenced by their information needs in daily life;
- They might use various strategies such as cross-media comparison to verify the accuracy of news.

The findings demonstrated that about half of the participants did not follow the news due to lack of time and lack of interest; and the others consumed news related to their areas of interest. Among those who got news, modern resources (especially social media) were used to receive news due to ease of access, more freedom, and lower cost. Yet this does not mean that young adults in this study trusted modern sources completely. Some past studies also discussed the low credibility of social media (e.g., Shao et al., 2018; Shu et al., 2017). However, social media can act as a gateway to mainstream news that is considered to be more reliable (Thom, 2016).

Traditional media (especially television) was the second choice for respondents in this study. But this was different from some other countries. For instance, in Britain television was found to be the most popular platform for adults' news consumption (Allcott & Gentzkow, 2017; Lancaster et al., 2012; Ofcom, 2019). This difference might have something to do with the trust of people in their government and the independence of the media. Although in this study we did not ask questions concerning the political views of participants as it could be a sensitive issue, the findings indicated that there was a link between trust and political views. Those who trust some traditional media might do so partly because they support the current political establishment and their control over the media. On the other hand, those who trust social media might do so partly because social media are not controlled as much by authorities whom they do not trust.

Furthermore, our findings showed that newspapers are the least preferred medium among young adults, who perceive them as being subjective and biased. This might be because most newspapers in Iran are affiliated to political groups, and it is difficult to find newspapers that reflect independent and critical journalism. They also thought that the yellow press has low-quality content, a finding that was also noted by Zerba (2011) and Casero-Ripollés (2012). These findings are not aligned with studies such as Ofcom (2019) and Jarvis et al. (2009), which stated that journals and newspapers have better quality, accuracy,

credibility, and neutrality in comparison to some other news platforms.

Due to the lower cost and fast dissemination of online news and the accessibility of social media, they have become fertile ground for the growth of false information (Shao et al., 2018). In these media, everyone is able to produce fake news. As our findings show, various reasons were mentioned by participants for the existence of fake news, including drawing audiences' attention, distortion of news, and financial and political incentives. These findings are similar to those reported by Allcott and Gentzkow (2017) and Tandoc et al. (2018).

However, most participants in our research mentioned that detection of fake news is almost impossible. In this regard, Leeder (2019), Pennycook and Rand (2017), and Silverman and Singer-Vine (2016) noted their participants could not detect fake news, especially when that news was separated from the original context or sources (Rubin et al., 2016). It was also found that familiarity with news makes it more believable (Soltanifar et al., 2017). In fact, people are not very successful at distinguishing and assessing fake news, as they rely on the first several items of searching results while using search engines such as Google (Leeder, 2019). They also tend to choose news that supports their current views (Shu et al., 2017) and accept any ideas that they do not fully understand (Rubin et al., 2016). But this does not imply that all people act passively in terms of evaluating news, indeed. Our study showed that young adults employed certain methods to determine the accuracy of their news. These include comparing various sources, examining news content, and so forth.

Some studies, such as Soltanifar et al. (2017) and Esmaeli et al. (2019), found education as an important factor in critical evaluation of news and suggested taking advantage of information and media literacy in addition to critical thinking (Leeder, 2019; Musgrove et al., 2018). Also, some studies suggested education should start from childhood and be conducted in elementary schools (Hernández-Serrano et al., 2017; Loos et al., 2018). As we mentioned, education can be provided directly and indirectly, but owing to the education system in Iran, which is influenced by ideology and therefore is not strong in teaching critical thinking skills, private institutions and non-governmental organizations might help to provide some sort of education, especially with regard to social media. Media such as short comedy clips (e.g., Iranian "Dirin Dirin" animation clips) are usually more attractive for people and they can be used for education and culture-building purposes.

When it comes to spreading fake news, our study showed that Tehran's young adults faced this problem cautiously and paid attention to the accuracy of the news. Overall, it seems impossible to prevent the dissemination of fake news, but it could be beneficial to implement culture-building practices and provide education; although Rampersad and Althiyabi (2020) found that in some societies age and culture are bigger factors than education in acceptance of fake news.

The future of news may be neither on television nor in the paper but on the Internet. The Internet is able to use all media (voice, video, and text) at the same time. Young adults also acquire the latest news in their field of interest online because of its efficiency, convenience, familiar feeling, and so forth. Of course, some people will still prefer television due to the large screen for some time yet (Meijer, 2007). However, according to Tehran's young adults, in the future people will use more modern news resources than traditional ones because of the penetration of the Internet in societies. Perhaps the presentation of news will change and new formats will emerge. However, social advancement will improve the academic level of individuals, which itself causes discernment of accurate news and truth from false information. Moreover, it is predicted that along with the advancement of the technology, some algorithms and more effective methods will be developed to detect fake news and prevent its dissemination. As Clayton et al. (2020) explained, various social media platforms might employ tags to identify fake or controversial stories. Van Heekeren (2020) also stated that social networks could assist with disclosing the identity of those who create and disseminate fake news.

In the end, we should again highlight the point that young adults are a significant and considerable part of society. They rely on their mobile devices and the Internet, meaning that they may be exposed to fake news most of the time, and therefore it is essential to teach them how to detect fake news and avoid spreading it. Future studies might look at how education can help people better deal with fake news and at what age or level such education can be most effective.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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APPENDIX. Interview questions

1. Are you actively following news? If no, why?
2. If yes, what kind of news do you mostly follow? Why?
3. What kind of news mostly attracts you? Why?
4. Where do you usually look for news?
5. How much time do you allocate to following news?
6. What was the last piece of news you read? From where?
7. When you are reading news, how do you evaluate it? Do you find any evidence for the truth of the news? From where can you find evidence?
8. What do you think about the last news you have read?
9. What criteria do you think should be considered for the truthfulness of news?
10. Do you think there should be training for determining true news and evaluating the news? If yes, how should it be?
11. How can the training influence people's behavior?
12. Do you use social media? Do you think using social media needs education? Have you taken any educational course in this regard?
13. How much fake news do you think there is in different media? Why is that?
14. What do you think about the reasons for the presence of fake news? How can you detect it?
15. How do you think the spread of the fake news can be prevented?
16. When you read news, do you share it? If so, do you pay attention to the reliability aspect? Have you ever read/seen news that appeared to be fake?
17. What do you think about traditional news media (programs and reliability)?
18. What do you think about other news media (content and reliability)?
19. What do you think about the future of the news and news media?

 https://doi.org/10.1633/JISTaP.2022.10.2.1

JISTaP http://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 10(2): 17-29, 2022

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2022.10.2.2

Exploring Student Engagement on Library Facebook Pages: A Survey of Vietnamese Academic Libraries

Duong Thi Phuong Chi*
Faculty of Philology, Perm State National Research University, Perm, Russia
Faculty of Library and Information Science, University of Social Sciences and Humanities Vietnam National University - Ho Chi Minh City, Vietnam
E-mail: duongthiphuongchi@gmail.com

ABSTRACT

Facebook is very popular among young people and especially university students. Therefore, Facebook is the most logical platform to be used by academic libraries for promotional purposes and reaching out to user communities. This study aims to measure the effectiveness of using Facebook in connecting with students in academic libraries. A questionnaire survey was conducted to collect research data from students at four Vietnamese universities. A total of 1,670 valid questionnaires were returned, and more than half of the respondents were females between the ages of 18 and 22 years. The survey results found that libraries' Facebook pages did not receive adequate attention and interaction from students. Besides that, the information needs of students and social media content in general affected student acceptance of libraries' Facebook pages. These factors are demonstrated by the great majority of students who used Facebook often for various purposes, but fewer accessed library pages and they were not actively engaged in library posts. Students were interested in the information they already tended to get from libraries and were optimistic about the quality of library posts. However, they still expected more diverse and attractive content from the libraries. The findings of this study can help libraries create a close connection with students by satisfying their needs and expectations on Facebook.

Keywords: Facebook, social networking sites, user engagement, academic libraries, Vietnam

Received: December 8, 2021 **Revised:** March 1, 2022
Accepted: March 14, 2022 **Published:** June 30, 2022

***Corresponding Author:** Duong Thi Phuong Chi
https://orcid.org/0000-0002-2992-0957
E-mail: duongthiphuongchi@gmail.com

1. INTRODUCTION

In the Internet age nowadays, social media is described as a global phenomenon with billions of users worldwide. Social media gives libraries many opportunities to improve communication with their users without time and distance limitations. King (2015) emphasized the benefits for libraries to use social media to increase the visibility of libraries, connect and share information with user communities, enhance the reach of users, and make libraries more modern. Sharma and Verma (2018) classified social media based on their primary purpose. They defined social media as encompassing various platforms such as social networking sites, blogs, discussion forums, video sharing, content sharing, social bookmarking, podcasts, and wikis. In particular, social networking sites are much more popular than others, which allows registered users to build a network of friends, interact, and share information (Scott, 2015). In the last few years, Facebook has become one of the largest social networking sites, with almost 2.89 billion monthly active users across the globe (Statista Research Department, 2021b). Previous research papers revealed library staff realize that the application of social media, especially Facebook, has a positive effect on both libraries and library users. While existing studies have mainly focused on using Facebook in libraries, the user aspect is often overlooked when doing research. Therefore, this current study aims to identify the use of library Facebook pages by students, clarify students' evaluation of library posts on Facebook, and then offer a few possible recommendations to raise the effectiveness of using library Facebook pages in connecting with students. Accordingly, the main research questions of this study are as follows.

RQ1. How do students use library Facebook pages?
RQ2. How do students evaluate library posts on Facebook?
RQ3. What are students' expectations for library Facebook pages?

The structure of this paper is: First, a brief review of the literature is conducted. Next, the research method is clarified. Then, the analysis of collected data is presented, followed by a discussion and recommendations on Facebook applications in libraries. Lastly, a conclusion is given.

2. LITERATURE REVIEW

2.1. Facebook

First launched in 2004, Reitz (2013) defined Facebook as a social networking site that allows individuals to create and upgrade personal profiles, maintain a friends list to whom messages can be exchanged, and join social networks organized by the school, workplace, city, or region. Facebook is free to use, making it open to everyone (Kohli et al., 2018). Facebook offers its users several functions, including status updating, photo or video uploading, reacting to and commenting on posts, as well as sending private messages (Chan et al., 2020). In addition, Facebook users can follow a page or someone and will then receive updates about them in the news feed (Wan, 2011). Besides this, Facebook provides an analytics section called Facebook Insights to measure engagement and usage (King, 2015). Internet users have different reasons for participating on Facebook, such as sharing and seeking information, maintaining communication between themselves and their families, friends, and colleagues, or leisure purposes (Al-Busaidi, 2014; Marino et al., 2016). In recent years, Facebook has grown to be the world's most commonly accessed social networking site, with almost 1.93 billion daily active users during the third quarter of 2021 (Statista Research Department, 2021a). The rising number of Facebook users demonstrates that Facebook plays an increasingly important role in social life (Shiau et al., 2018). Divine et al. (2019) reported that 23% of Facebook users were young people aged 18-25 years. Significantly, Facebook usage among students is increasing, and 32% of university students spend more than four hours of their daily time on Facebook (Divine et al., 2019).

2.2. Facebook Use in Academic Libraries

More and more libraries are building a presence on social media (Vassilakaki & Garoufallou, 2014). Taylor and Francis Group (2016) provided an overview of current practices relating to social media application by libraries worldwide. They reported that social media is now widely used, with more than 70% libraries participating. In particular, Facebook is the most popular academic library platform today (Cheng et al., 2020). Previous studies identified that academic libraries used Facebook to promote information resources and services, deliver online services, reach out to users, and improve teaching and learning of information literacy (Cheng et al., 2020; Chugh & Ruhi, 2018). Several content analyses were carried out on Facebook pages of academic libraries and reflected differ-

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ent uses of Facebook. Notably, academic libraries in the United States used Facebook to promote library services and make community connections using posts designed to pique users' curiosity in the casual language used (Harrison et al., 2017; Phillips, 2011). Likewise, Croatian libraries mainly adapted Facebook for promotional purposes, sharing links potentially interesting to users (Zorica et al., 2012). Roos (2013) revealed that Facebook was adapted mostly for announcements by Estonian academic libraries. In addition to content analysis, measuring the success of library posts has been discussed in recent studies. According to Glazer (2012), the level of engagement with posts is a significant indicator to measure the use of Facebook. More specifically, engagement is calculated by the total number of likes, shares, and comments on posts (Al-Daihani & Abrahams, 2018; King, 2015).

2.3. Literature Gap

As mentioned above, numerous studies on Facebook adoption among libraries have been carried out in the last few years. Although libraries need to know how to use social media effectively by understanding their users' behavior, culture, and etiquette, only a few studies focus on users through collecting data from them (Cheng et al., 2020). Moreover, previous studies mainly mentioned academic libraries in the West. More case studies on Facebook use in Asian countries are needed to comprehensively understand the Facebook phenomenon in libraries worldwide (Aharony, 2012; Chan et al., 2020). Although many Vietnamese libraries use Facebook, research on Facebook is still limited from both users' and libraries' sides (Hồ, 2018). Therefore, this present study tries to fill the research gap by analysing the use of Facebook as a connecting tool between libraries and users from the student perspective in Vietnam.

3. METHODOLOGY

In the context of the limitation of time and resources, this study is limited to four academic libraries in Ho Chi Minh City (Vietnam). The criteria for choosing universities were: firstly, the four universities are national-level public universities that cover many science fields with a wide range of curricula. Secondly, the universities were ranked among the top universities in Vietnam, and each university had a large population with more than 20,000 students and staff (uniRank, 2020). Finally, the libraries of the universities must have their own official Facebook pages. Academic libraries participating in the current study include the Library of the University of Social Sciences and Humanities (USSH), Library of University of Science (US), Library of University of Technology and Education (UTE), and Library of Ton Duc Thang University (TDTU).

This study aims to fill a literature void by collecting data, mainly from students. A quantitative survey was applied as the primary source of information, collected through a questionnaire. Questions collected information on how students use Facebook, the use of libraries' Facebook pages by students, how satisfied they are with li-

Table 1. Demographic characteristics of respondents

Variable		USSH	US	UTE	TDTU	Total	
						Frequency	Percentage % (n=1,670)
Sex	Male	81	220	180	195	676	40.48
	Female	339	181	265	209	994	59.52
Age	18 years-less than 20	217	123	261	121	722	43.23
	20 years-less than 22	131	189	135	224	679	40.66
	22 years and above	72	89	49	59	269	16.11
Year of study	Year 1	167	101	235	133	636	38.08
	Year 2	103	149	117	137	506	30.30
	Year 3	81	75	78	98	332	19.88
	Year 4	69	76	15	36	196	11.74

USSH, University of Social Sciences and Humanities; US, University of Science; UTE, University of Technology and Education; TDTU, Ton Duc Thang University.

brary posts, and what content they would like to see from libraries on Facebook. The Likert scale has been applied in the questionnaire. Two professors familiar with the application of social media in communication activities were invited to test the questionnaire for consistency and validity. A pre-test was conducted among a few students at each library to identify any problems regarding the questionnaire's content and structure. The online questionnaire was created using Google Forms, then placed on the Facebook pages of the surveyed libraries and e-mailed to students in June 2020. Because of the large number of students, the formula recommended by Yamane (1967) was used to determine the minimal sample size to investigate (Israel, 1992; Yamane, 1967). In total, 1,670 student responses were gathered within three weeks from June 1 to 21, 2020 (see Appendix).

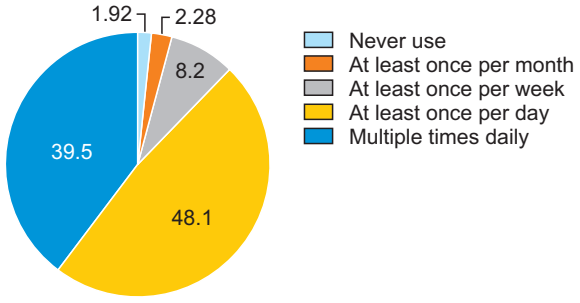

Fig. 1. Level of students' use of Facebook.

4. RESULT AND DATA ANALYSIS

4.1. Respondents' Demographic Characteristics

Respondents to the questionnaire were requested to clarify their demographic characteristics (i.e., sex, age, and year of study). As shown in Table 1, more than half of the respondents were female (59.52%), while 40.48% were male. Furthermore, 43.23% were aged between 18 to less than 20 years old, 40.66% were aged between 20 to less than 22 years old, and 16.11% were aged 22 years and above. The respondents' composition regarding years of study was: 38.08% were in the first year, 30.3% were in the second year, 19.88% were in the third year, and 11.74% were in the fourth year.

4.2. Students' Use of Facebook

Students were asked to provide information on their habits and preferences on Facebook. It was clear from the results that Facebook is very popular among students. Almost all respondents were active on this platform (98.08%). In particular, most respondents answered they use Facebook "at least once per day" or "multiple times daily" (Fig. 1).

Next, students were asked about their purposes for using Facebook. According to Fig. 2, respondents overwhelmingly use Facebook for finding entertaining con-

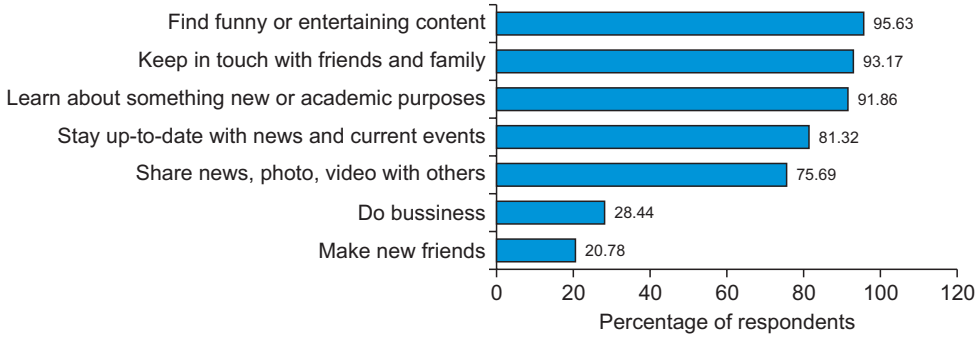

Fig. 2. Students' purposes of using Facebook.

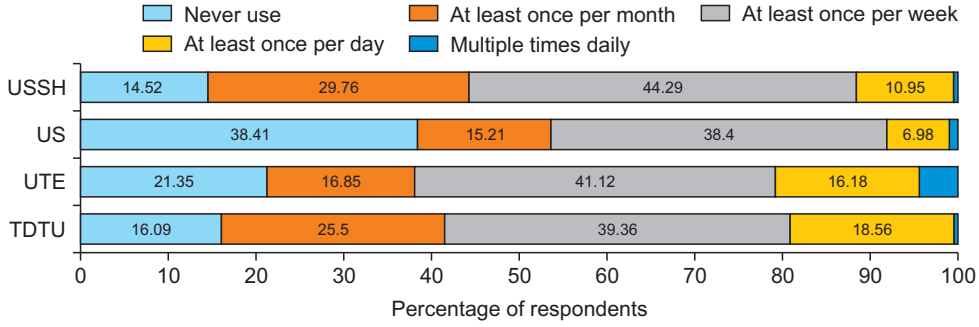

Fig. 3. Level of students' use of libraries' Facebook pages. USSH, University of Social Sciences and Humanities; US, University of Science; UTE, University of Technology and Education; TDTU, Ton Duc Thang University.

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tent (95.63%), keeping in touch with friends and family (93.17%), or learning about something new or academic purposes (91.86%). There were other purposes based on the answers to this question, ranging from staying updated with news of their interests to sharing information, photos, and videos with others, doing business (e.g., selling products online), and making new friends.

4.3. Students' Use of Libraries' Facebook Pages

Respondents were asked how likely they were to use libraries' Facebook pages. Fig. 3 illustrates the responses received. However, most respondents use Facebook for personal reasons, and fewer access library pages. For example, 38.41% of the US respondents reported they "never use" the library page on Facebook.

Regarding the reasons for the non-usage of libraries' Facebook pages, respondents who stated "never use" were asked to explain why they did not access their libraries' pages (Fig. 4). The study found out that students had a high awareness of Facebook but a low awareness of library Facebook pages. Lack of understanding of the sites' existence was the main reason the respondents did not use libraries' Facebook pages, given by 62.3% at USSH, 51.95% at US, 60% at UTE, and 27.54% at TDTU. Other reasons for non-usage were that students did not find their libraries' pages, were not interested in the information provided by the library, and did not need libraries or their services. These results indicated that libraries need to spend more time and effort to increase their visibility and enrich their social media content on Facebook.

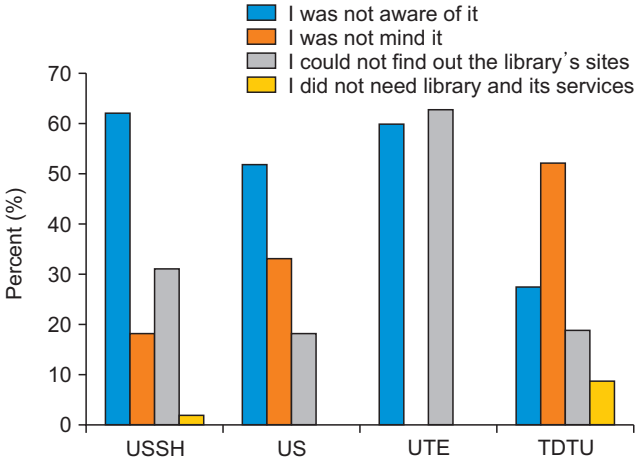

Fig. 4. Reasons for non-usage of libraries' Facebook pages. USSH, University of Social Sciences and Humanities; US, University of Science; UTE, University of Technology and Education; TDTU, Ton Duc Thang University.

Next, respondents were asked about their purposes while accessing pages supplied by libraries (Fig. 5). The survey results found that "Learn about what's happening in the library" and "Learn about library resources, products, and services" were reported as the primary purposes of using libraries' Facebook pages with 79.54% and 78.38%, respectively. Besides this, most respondents (74.13%) used libraries' Facebook pages to "Learn information skills," which included examples such as seeking information in the various collections within the library, or accessing different specific online databases. Following this, 49.5% of respondents chose "Learn about general library information," which included library hours, contacts, policies, and rules. 41.54% of respondents used libraries' Facebook pages to "Give feedback or interact with the library," followed by "Sharing information with others" with 24.17%. Coming in last, which still means 9.81% of respondents, was "Make new friends."

4.4. Students' Interaction with Library Posts

If students become engaged with libraries through social networks, this can influence their perceptions and actions. However, the current study finds low student interaction with libraries' posts. More than half of the respondents (54.98%) have never interacted with libraries on Facebook (Fig. 6).

Respondents who interacted with libraries were then

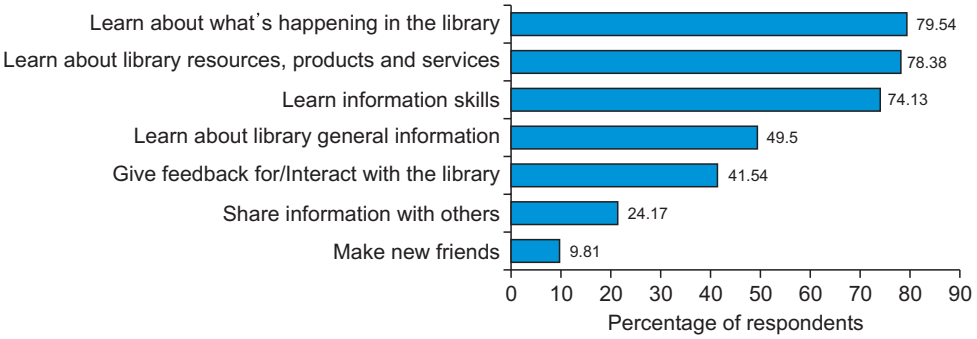

Fig. 5. Students' purposes while accessing libraries' Facebook pages.

asked to clarify their interactions (Fig. 7).

According to Fig. 7, most respondents interacted with library posts using emoticons to express their emotions (79.25%). The following most frequent interaction was sharing libraries' posts on their profile (31.9%). When students are engaged with libraries and respond positively to the content, they share it with friends. This can be beneficial to libraries, especially when many students do not access libraries' Facebook pages. These students may still receive messages from libraries through their peers. The third most common interaction was commenting on libraries' posts. Although the number of respondents who left comments was still low (31.56%), commenting might help spread the libraries' posts and attract more attention from other users on Facebook. Lastly, 23.33% of respondents contacted librarians via Facebook chat messages. The reasons for these contacts were questions about the library and questions about resources or events mentioned.

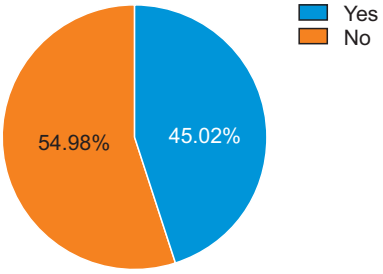

Fig. 6. Number of respondents who interacted with libraries.

4.5. Student Ratings of Library Posts

Students were asked how they rated the quality of the messages posted on libraries' Facebook pages from "very poor" to "excellent." The responses received were relatively positive in general (Fig. 8).

Firstly, criteria related to the content of messages were evaluated. As shown in Fig. 8, the diversity in content was rated "fair" by nearly half of the respondents (46.18%). This demonstrates that librarians should carefully select wider content in addition to content directly related to the library itself. Next, respondents were asked if they thought messages shared on libraries' Facebook pages were useful and relevant. As expected, Fig. 8 shows the responses were overwhelmingly positive, with the rating as 30.04% "excellent" and 45.64% "good." Students are very familiar with social networks since they often use them for various purposes. Therefore, useful and relevant content will encourage students to accept libraries as a source of good quality information, which might help to increase the use of library facilities and resources. Although the value of frequently updated content was measured as "fair" by the majority of respondents in total (40.77%), 29.73% of respondents rated this criterion as "good." Generally, among the content criteria, the relevant and useful messages posted had the most excellent rating, while the frequently updated criterion had the poorest rating.

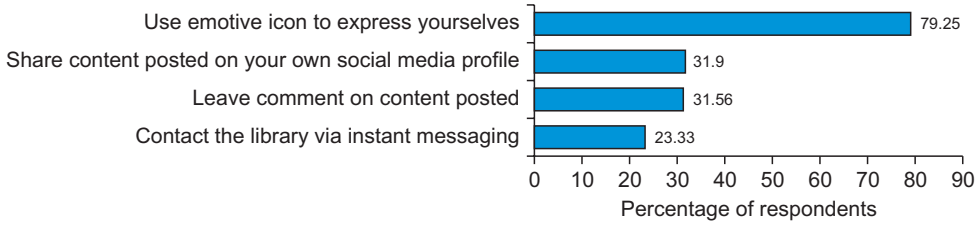

Fig. 7. Types of student interactions on libraries' Facebook pages.

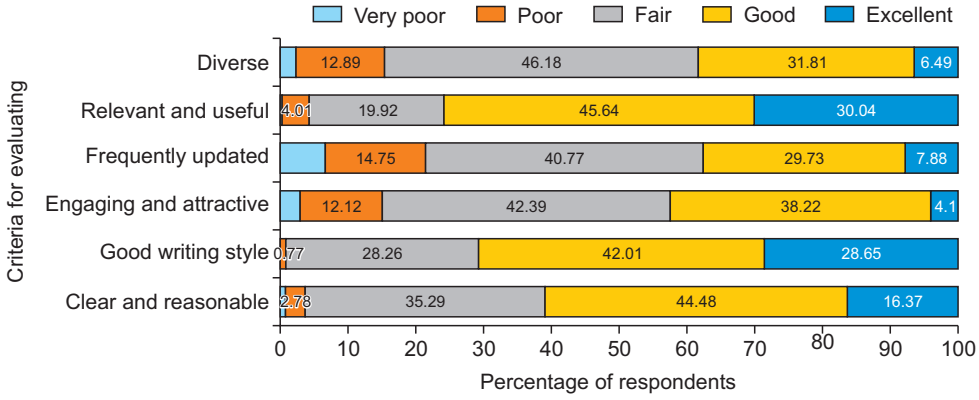

Fig. 8. Student ratings of libraries' posts on Facebook.

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Then, respondents were asked to evaluate criteria related to the format of messages that appeared on libraries' Facebook pages. In particular, respondents were asked about the attractiveness of libraries' posts. The results were relatively modest: 42.39% of respondents rated it "fair." Most respondents found libraries' messages were written in a good writing style. The rating was 28.65% "excellent" and 42.01% "good." Likewise, the survey results also show that respondents were impressed with the clear and reasonable format of libraries' messages, with 60.85% rating it as either "excellent" or "good." In short, when all the criteria for format are compared, good writing style had an excellent rating while being engaging and attractive had the lowest rating.

4.6. Impact of Libraries' Facebook Pages on Students

Respondents were asked about statements related to the effectiveness of Facebook as a way of raising awareness amongst students. Most of the respondents recognized certain benefits of using Facebook. Responses are presented in Fig. 9.

Facebook was considered an effective tool for libraries to promote and communicate with users. Most respondents agreed that they were made aware of library resources, services, and activities through Facebook. Respondents were also asked about their use of libraries due to their promotion via Facebook. The findings are encouraging as they demonstrate that promotion via Facebook impacts the use of information resources, products, and promoted services. Many respondents thought Facebook had increased their use of the library with 35.98% "agree" and 16.53% "strongly agree." This is positive because it means Facebook is helping to encourage students to use libraries.

Making librarians more accessible through online interactions is one of the primary benefits of adopting Facebook in libraries. Responses to the statement "I have contacted the library more often" were overwhelmingly positive. "Strongly disagreed," "disagreed," and "neutral" responses were in the minority with this statement. Online contact with libraries was available previously. There was still an element of inconvenience, as students had to visit the library website to get contact details in the past. In contrast, they can directly contact librarians more quickly by making librarians seem more approachable. Facebook can break down barriers between libraries and students.

Twenty-one percent (21.08%) of respondents strongly agreed, and 40.62% decided that it is important for libraries to maintain a presence on Facebook. Students are very tech-aware, so it is no surprise that they respond positively to using Facebook.

4.7. Students' Expectations for Libraries' Facebook Pages

Respondents were asked what content they would like to see from libraries on Facebook. The questionnaire presented a list of contents from which respondents could choose, including how to use library resources and services (e.g., finding materials, using scanners or printers, renewing checked-out books); library collections and resources info (e.g., information about authors whose books libraries have, information about what is in digital collections or curriculum collections, information about specific databases); library news (e.g., if the library wins an award); research techniques and tips; non-academic reading (e.g., new arrivals in recreation collections, reading suggestions over breaks, interesting websites); and campus-wide events (Fig. 10).

Respondents widely selected all types of content, with the three most chosen content options being research techniques and tips (80.23%), library collections and re-

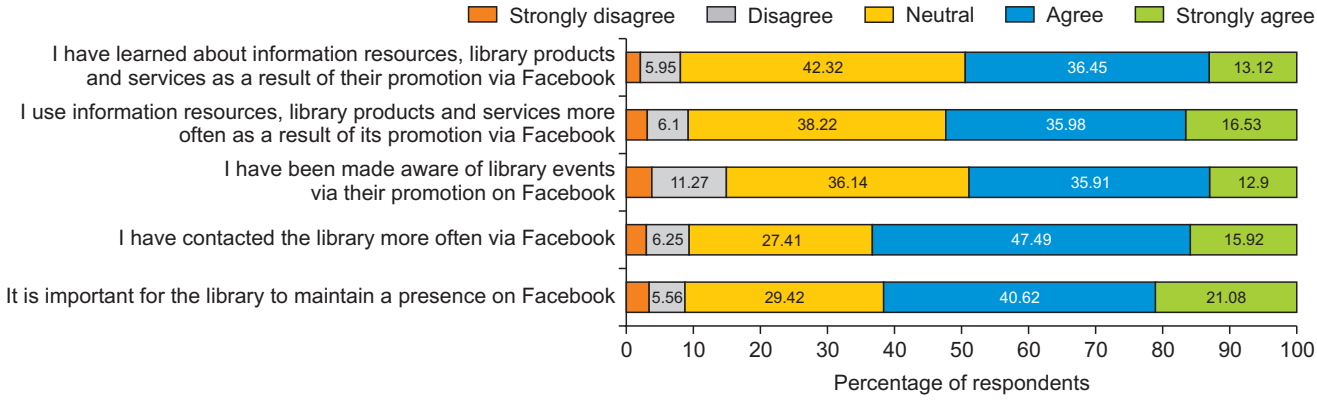

Fig. 9. Student responses to statements related to Facebook use in libraries.

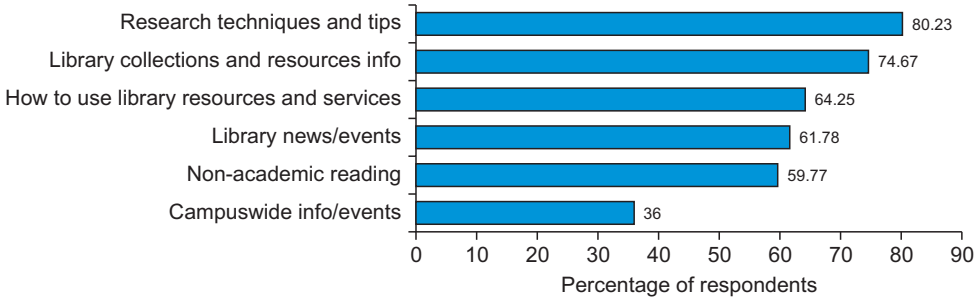

Fig. 10. Students' expectations for the content of library posts.

sources info (74.67%), and how to use library resources and services (64.25%).

Besides the content of posts, respondents thought that libraries need to improve the quality of photos and videos. Respondents also suggested that libraries use special Facebook features such as stories, hashtags, and live videos to attract more viewers.

5. DISCUSSION AND SUGGESTIONS

5.1. Students' Use of Library Facebook Pages (RQ1)

The survey results show that students currently use Facebook very often. Facebook is a primary tool for students to communicate with classmates, family, friends, and others. However, students who used library Facebook pages did so only rarely or did not use them at all. A significant portion of respondents did not access library pages because they did not know about them. Thus, libraries need to solve this problem. The good news for libraries is that students are interested in the information they receive from libraries on Facebook, including information about libraries and their products, services, or announcements. Therefore, libraries need to communicate with students regarding services, collections, events, and more.

Moreover, students were passively engaged in libraries' posts because they rarely like, share, and comment on posts. It shows that most students were merely consuming information. If libraries are serious about using Facebook to communicate with students, then libraries need to put more effort into interacting with them.

5.2. Students' Evaluation of Library Posts on Facebook (RQ2)

The findings revealed that students' assessment of library posts' quality was generally relatively positive. Students appreciated the usefulness of the library messages. The library pages had low student engagement because the content format was not interesting. The use of Facebook has a positive impact on those who use it, and students feel Facebook is an effective way to communicate with libraries. Facebook provides a reminder of libraries and encourages students to use their advertised resources and services. By giving students content that is both helpful and interesting, the library is helping to solidify its reputation as a place for quality information. This will encourage students to think about the library when they need information and will raise library use.

5.3. Students' Expectation for Library Facebook Pages (RQ3)

The survey results showed that students expect and are mainly interested in information for academic purposes. Perhaps unsurprisingly, students pointed out that libraries should increase the quality of visual content and actively use various Facebook features to attract interaction. If libraries create content that aligns with student preferences, the level of engagement on Facebook will increase.

Based on the survey results, the author makes a few recommendations to optimize library Facebook pages.

5.3.1. Content of Posts

As mentioned above, students mainly want to know and discuss research designs and tips, library collections and resources information, and how to use library resources and services. Therefore, library posts should focus on:

- Tips for finding research data, research support tools (e.g., plagiarism prevention software checks; bibliographic management tools to help students organize, manage, and format citations for their research; helpful data visualization tools such as Google Charts, Tableau, D3.js, and so on)

- Information resources available within the libraries, such as books, journals, theses and dissertations, digital collections, research databases, notices of new additions to library collections, and how to access them. Additionally, libraries should always include a link to the resources they are promoting.

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- Library products (e.g., bibliographies, subject guides built by librarians to help students through the research process, and other aids designed to introduce students to materials the library provides and to guide them in finding available research resources)

- Library services like borrowing services (e.g., step-by-step guides to setting up student library accounts, loan periods, renewal limits, fines, and fees), interlibrary loan (e.g., who can borrow materials through ILL, how to request items that are not available from the library, which things that can/cannot be requested, costs to use ILL), digitization services (e.g., guidelines and fees for reproduction services for library materials), library instruction, and so on.

Library-centered content is essential and needs to be shared, but reposting and sharing external content that interests users is also a great idea. One of the primary purposes of using Facebook is learning about something new or for academic purposes. Therefore, academic libraries can post content about scientific activities outside libraries, research tips to interesting content from relevant publications, and information related to the research interests of faculty and students.

5.3.2. Format and Frequency of Posts

Besides content, it is essential to consider the format of posts. Students welcomed libraries' use of social media, but they expected libraries to change their uninteresting style on Facebook and make better use of Facebook features to attract more attention. Therefore, libraries should incorporate more visually appealing graphics and videos when creating Facebook posts. An example is word clouds – a popular type of image. Libraries can take words from books, journals, research articles, or keywords in different subjects and run them through a word cloud creator, save the image, and share it on libraries' Facebook pages. Dur (2014) explained that the human mind can perceive visual information transfer more quickly, efficiently, and permanently than written or verbal information. Thus, having infographics in posts can make students remember information quickly and easily. An infographic is suitable for presenting searching guides and statistics related to library resources and services.

A post on Facebook can get lengthy, with more than 63,000 characters allowed (Buck, 2012). Previous studies have presented which character length attracts the most engagement on social networks. Margolis and Treptow (2017) reported that Facebook posts with 80 characters or less received 66% higher engagement. Therefore, libraries should keep their posts as short as possible but ensure that libraries include all the most essential information. Besides this, libraries should use casual language and not take the library too seriously to create a friendly and positive atmosphere for users (Garoufallou et al., 2013).

In addition, librarians need to understand that using Facebook as a connection tool requires considerable attention. If libraries cannot update their Facebook pages at least once a week or more, it may not be a successful or useful tool (Jacobson, 2011). Thus, libraries must pay attention to constantly updating information. Two posts of well-curated content per week is a good starting point (EBSCO, 2019). Besides posting regularly, libraries should choose the best time to post. According to Hootsuite's data (Cooper, 2021), Facebook users are the most active in the early morning and around noon on weekdays, so these times are considered the most effective for posting.

5.3.3. Enhancing Social Interaction with Students

First, librarians should take the initiative by engaging in discussions on library Facebook pages, which can be done through participating in giving likes, sharing, and commenting on posts using their accounts. Second, libraries should adopt updated and advanced features supported by Facebook. Mainly, libraries can use the Facebook Live feature to broadcast real-time video posts when activities or events are held in libraries, such as talks by famous authors, workshops, and library tours. Although it is not a technically complicated feature, Internet users may spend three times longer watching a video when it is broadcasted (Lavrusik & Capra, 2016). In the context of libraries, this can engage students who cannot attend events in person. Next, libraries can also use hashtags with the common language of university members. By doing so, students can easily search for relevant conversations. This also gives convenient connections to other academic libraries across the country. Thus, libraries may consider sharing more relevant and useful information, and hot topics, by adding hashtags in posts. Besides this, libraries can adopt chatbots to provide students with automatic answers for frequently asked questions (Harrison et al., 2017).

5.3.4. Popularizing Library Facebook Pages

The findings revealed that students had a low awareness of library Facebook pages. Thus, libraries should focus on popularizing library pages to increase users' access. This involves increasing followers on pages to ensure that as many users access the information shared on Facebook

as possible. Three main factors that can help libraries disseminate their Facebook pages are the service staff, liaison librarians, and library fans. In particular, the service staff can mention library Facebook pages to users during their interactions. Liaison librarians nowadays communicate with students and faculty by attending and presenting at faculty meetings, providing library orientation and information literacy lectures, and organizing events in collaboration with faculty members. Therefore, liaison librarians can help spread the word about the library's Facebook pages from one person to another through a network of relationships. Library fans are the familiar users of the library, such as colleagues and student volunteers. They use the library frequently and have a positive attitude towards the library. Thus, libraries can ask them to follow library pages with their accounts. These fans can be encouraged to actively write comments on library pages to create a warm discussion among users and encourage more interactions.

In addition, the library can follow the Facebook pages of other departments of the university to expand the library pages' visibility. Through collaboration with other departments, the information posted by libraries will be spread more quickly and broadly. Moreover, libraries should link library pages frequently in relevant locations, such as library websites, newsletters, and notice boards.

Last but not least, the library website is an official online presence of the library and always attracts many visitors. However, at the time of this writing, the USSH and US did not include links to their Facebook pages from library websites. To popularize them, the USSH's and US's Facebook pages should be linked from the main website of these two libraries. By doing this, visitors to the library website will know that the library has a Facebook page, they can visit it, and they have the opportunity to like the library's Facebook page.

6. CONCLUSION

This study investigated student engagement on the Facebook pages of four academic libraries in Ho Chi Minh City (Vietnam). An online survey was conducted among students. The survey found that almost all respondents were active on Facebook for personal reasons, but fewer accessed libraries' Facebook pages. The most common reason for non-usage was a lack of awareness of library pages. The data collected also revealed that the number of respondents who interacted with libraries' posts and contacted librarians on Facebook was low. Although respondents were optimistic about the quality of content posted on libraries' Facebook pages, they reported that the library posts lacked attractiveness.

Additionally, most respondents welcomed library presence on Facebook and stated that it positively impacted their perceptions. However, respondents expected more diversified and exciting content from libraries. According to student feedback, a few recommendations to increase effectiveness in connecting with them are given, such as sharing social media content that consists of students' interests, posting with a higher level of vividness, uploading content more frequently, and using special Facebook features to make libraries' Facebook pages more active and attractive. Besides this, libraries should enhance social interaction with students and popularize library Facebook pages. The survey's sample size was small to generalize how students engage with libraries on Facebook. Still, the author hopes the findings will contribute toward academic libraries some insights to improve communication and meet the needs of students on social networks.

ACKNOWLEDGMENTS

I would like to thank students at four Vietnamese universities for their valuable responses. My sincere appreciation is expressed to Prof. Dr. Vladimir V. Abashev and Dr. Ngo Thanh Thao for useful feedback on my research.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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APPENDIX. Determining Sample Size

Yamane Taro is a famous statistician who has contributed to developing sampling methods. Taro provided a simplified formula to calculate sample sizes that can be used to determine the minimal sample size to analyse any given population size. The formula is shown below (Yamane, 1967, p. 886).

$$n=\frac{N}{1+N(e)^2}$$

Where: **n** is the sample size
N is the population size
e is the level of precision (the acceptable sampling error)

The level of precision, sometimes called sampling error or allowable error, is the range in which the actual value of the population is estimated. The acceptable sampling error is often expressed in percentage points, and the formula from Yamane assumes a 95% confidence level and ±5% allowable error (Israel, 1992).

In this research, the author identified the survey sample based on the formula of Yamane Taro with a 95% confidence level after calculating the sample size by substituting the numbers into this formula. The sample numbers are presented as follows.

Sample size in the surveyed libraries

Name of library	Population size	Minimal sample size	Number of student responses
USSH	22,000	393	420
US	20,038	392	401
UTE	25,089	394	445
TDTU	23,792	393	404
	Total		1,670

JISTaP http://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 10(2): 30-44, 2022

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2022.10.2.3

Enhancing Business Continuity in the Oil and Gas Industry through Electronic Records Management System Usage to Improve Off-Site Working: A Narrative Review

Burkan Hawash*
Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Malaysia
E-mail: burkan.hawash@yahoo.com

Umi Asma' Mokhtar
Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Malaysia
E-mail: umimokhtar@ukm.edu.my

Zawiyah M. Yusof
Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Malaysia
E-mail: zawiy@ukm.edu.my

Muaadh Mukred
Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Malaysia
E-mail: mmkrd@yahoo.com

ABSTRACT

The primary function of an electronic records management system (ERMS) is to support organisations in providing effective records management services by enabling efficient remote access to the organisations' records. This helps the organisation to continue running during emergency events, such as the COVID-19 pandemic. The need to study ERMS for accessing records remotely has increased dramatically, due to the increase in daily use. The situation arising from the COVID-19 pandemic has increased the need for implementing proper digital systems, such as ERMS, to enable efficient work processes and enhance business continuity. An ERMS has the potential to allow organisations to create records and workflows off-site. During a pandemic, the ability to structure processes digitally helps in maintaining operations remotely. This study aims to provide a narrative review of the ERMS literature with an emphasis on explaining the primary components of ERMS that act as enablers for the implementation of the system in the oil and gas sector of developing countries. The current study proposes ERMS roles and responsibilities that could enhance business continuity. The authors use a qualitative narrative review and analyse the literature related to this study and its findings. The results show that, in cases of risk or crises, staff members need to have easy access to their records and documents to remain productive. An ERMS allows professionals to remain active and work off-site. Thus, ERMS play a significant role in protecting an organisation's content through the monitoring and control over who has authorisation to access its records.

Keywords: electronic records management system, digital transformation, business continuity, developing countries, oil and gas sector, legislation

Received: September 1, 2021 **Revised:** February 21, 2022
Accepted: April 19, 2022 **Published:** June 30, 2022

***Corresponding Author:** Burkan Hawash
https://orcid.org/0000-0003-2721-7528
E-mail: burkan.hawash@yahoo.com

1. INTRODUCTION

In recent years, digital transformation in the oil and gas sector has become essential, although many organisations are still lagging behind in terms of implementing electronic and digital systems, such as electronic records management systems (ERMS). Many oil and gas organisations need an ERMS to replace physical access to their documents with digital, remote access to support decision-making, to enhance accountability and business continuity, and to improve information quality management (Gezdur & Bhattacharjya, 2017; Hawash et al., 2019; Hawash et al., 2020b; Mukred et al., 2022). Therefore, digital transformation has shown real benefits for management in the oil and gas industry in terms of simplifying electronic processes and decreasing the cost of physical processes. An ERMS has many valuable features that help organisations improve their records management (Gezdur & Bhattacharjya, 2017).

An ERMS is a digital tool that has the ability to create and store an organisation's records. In oil and gas organisations, an ERMS is used to create well data, logistics records, human resources, and financial records and log drilling activities. ERMS have the ability to transfer information, track each transaction, and secure the information contained in records by making them available only to authorised users (Dinah et al., 2019; Mukred et al., 2019a, 2021). Many organisations use an ERMS interchangeably with other digital and electronic systems, such as electronic document management systems (EDMS) and electronic content management systems (ECMS). An ERMS is one of the most important tools for records management, designed to keep organisational information aligned with quality standards in order to support business continuity (Mukred et al., 2016).

In order to ensure ERMS functionality, the system requires an infrastructure capable of exchanging records between users and the ERMS software (Mukred et al., 2019b). ERMS can be used by managements of oil and gas organisations to enable record keeping and facilitate retrieval when documents are needed for access or disposal in the future (Hawash et al., 2020c; Mukred et al., 2018). Recently, the COVID-19 pandemic has hampered business in developed and developing countries, such as the USA, Italy, Brazil, South Africa, India, Yemen, and Malaysia. This has required the functions of most business processes to be carried out at home. This has made the ERMS an important system for enabling users to work from home and keep their data protected (Gasser et al., 2020). This study has two objectives. The first objective is to present related literature to show the characteristics of ERMS that can enhance business continuity in developing countries, including Yemen. The second objective is to explore the enablers of ERMS implementation in developing countries. Therefore, a narrative literature review was conducted using databases, including among others, Science Direct, Emerald Insight, IEEE, JSTOR, Springer Link, and Wiley.

2. METHOD

For the purpose of this paper, the literature was reviewed and analysed to find relevant literature on the uses of ERMS for digital transformation. A narrative analysis investigating the content of the data to provide an overview of the practices and purposes of ERMS in the oil and gas sector, particularly in developing nations, was conducted. This study investigated publications that detailed the uses of ERMS in oil and gas organisations. Furthermore, the study examined articles related to EDRMS, EDMS, digital transformation initiatives, and archive practices in various operational settings, including the oil and gas sector in developed countries. The selection of articles was based on their aim, which is appropriate for this study. From sources such as Science Direct, IEEE, JSTOR, Springer Link, and Wiley, the review focused on publications published between 2018 and 2021, and a few important articles published in 2010, including both subjective and quantitative studies. The literature was reviewed several times to achieve the objectives of this study. This study analysed available content and the number of articles that were reviewed are 53.

Initially, certain keywords were applied in the searching process, both separately and combined with AND and OR: for example, electronic records, records management, electronic records management system (ERMS), electronic documents and records management system (EDRMS), business continuity, AND characteristics of ERMS. These keywords were combined with a variety of semantic equivalents to account for obstruction, such as issues, problems, success factors, obstacles, challenges, difficulties, and failure (in the context of assisting with business continuity). Additional articles were found on Google Scholar to ensure a wide coverage of papers. The study chose the selected keywords based on the experience of authors in the records management field, based on what was felt would be appropriate for the literature review. Articles that were identified as related or cited by the da-

tabases were also screened for relevance. The researchers chose high-impact journals in order to ensure accuracy and proven impact on the field of records management. Most of the selected articles addressed the use of ERMS in supporting organisational records management. In particular, within the reviewed articles, the researchers identified numerous suggestions for the use of ERMS tools for supporting business continuity during emergencies.

The study created a scoring rubric by cross classifying the oil and gas organisations' needs for the use of an ERMS. The researchers extracted information and classified each technological report noted by the selected articles according to the oil and gas organisations' targets, grade of innovation, and scalability to developing countries. An objective and systematic reading of the contents of the documents was carried out to identify how an ERMS is needed to support records management during emergencies in the oil and gas industry. Texts were also analysed by reading the abstracts and whole articles in order to identify their themes and relationship with the aim of this study. Moreover, the findings for relevant articles were summarised and synthesised. The narrative analysis approach used in this paper reveals how organisations respond to ERMS implementation while preserving the integrity and confidentiality of their important records.

3. CHARACTERISTICS OF ELECTRONIC RECORDS MANAGEMENT SYSTEMS

An ERMS allows users to electronically save, keep track of, recover, share, issue, and maintain records throughout their lifecycle. This system is a complete system covering the entire scope of organisational business activities (Kautto & Henttonen, 2020; Nguyen et al., 2016). An ERMS is key to business continuity as it has the ability to enhance many significant processes, including improving organisational service delivery, ensuring that organisational or industrial legal requirements are followed, and reducing serious, unintended consequences (Colwell, 2020). An ERMS represents a vital system for supporting the security and value of a business if it is applied correctly and actively (Al Ali et al., 2019).

The adoption of an ERMS enables oil and gas organisations to improve their digital systems, making them faster, more rigorous, and more trustworthy when users access large volumes of records. Thus, electronic records are kept safe, accessible, and maintained correctly (Luyombya, 2018; Luyombya & Bukirwa, 2014). Furthermore, the ERMS helps the oil and gas sector change their reporting system from paper records to electronic formats, which can be stored across organisations' ECMS in order to obtain maximum value from investment. Using information in an organised manner assists the oil and gas sector with compliance in term of regulations, requests for information, and efficient processing. Moreover, ERMS leads to improving operations by managing records that are accessible to the business in a manner that generates the most revenue for the country (Tsabedze, 2020a, 2020b). ERMS usage also increases the level of awareness among employees regarding the importance of business continuity in this sector. Furthermore, an ERMS protects records that contain important information related to the production of oil and gas. Such crucial information should be kept as confidential information (Luyombya & Bukirwa, 2014). Despite their effectiveness, ERMS still have a low rate of adoption in the oil and gas sector, although they would be beneficial tools for managing a large number of records. Thus, ERMS can help the oil and gas sector satisfy information management policies and fulfil external regulatory needs (Mukred et al., 2019c, 2021). ERMS increases efficiency in the management of records, which can help in making important data compatible with regulations, while also decreasing the likelihood and impact of litigation (Mukred et al., 2021; Taiwo, 2019). There are significant opportunities and potential future gains for ERMS, according to the National Archives of the USA (2016). Both private and public sector organisations have gradually had to improve their record keeping, largely due to the introduction of various laws and rules that cover reliable record management. The record management role has shifted from the fringes to the core of management (Hawash et al., 2020a, 2021).

The incorrect implementation of an ERMS can lead to poor management and errors. This has led companies to address the crucial components that are necessary for an ERMS to function effectively in the oil and gas sector, as shown in Fig. 1. These components are health, safety, and environmental (HSE); off-site; drilling; administration; logistics; registration; IS/IT; and HR and finance. Table 1 summarises and describes the functions of the ERMS components in oil and gas organisations.

Record keeping systems with the above features allow reliable, genuine, and information-rich records to be easily produced and maintained. Besides these features, records management systems must be able to execute a variety of standard tasks. This enhances business continuity and helps organisations continue working during the COVID-19 pandemic.

 https://doi.org/10.1633/JISTaP.2022.10.2.3

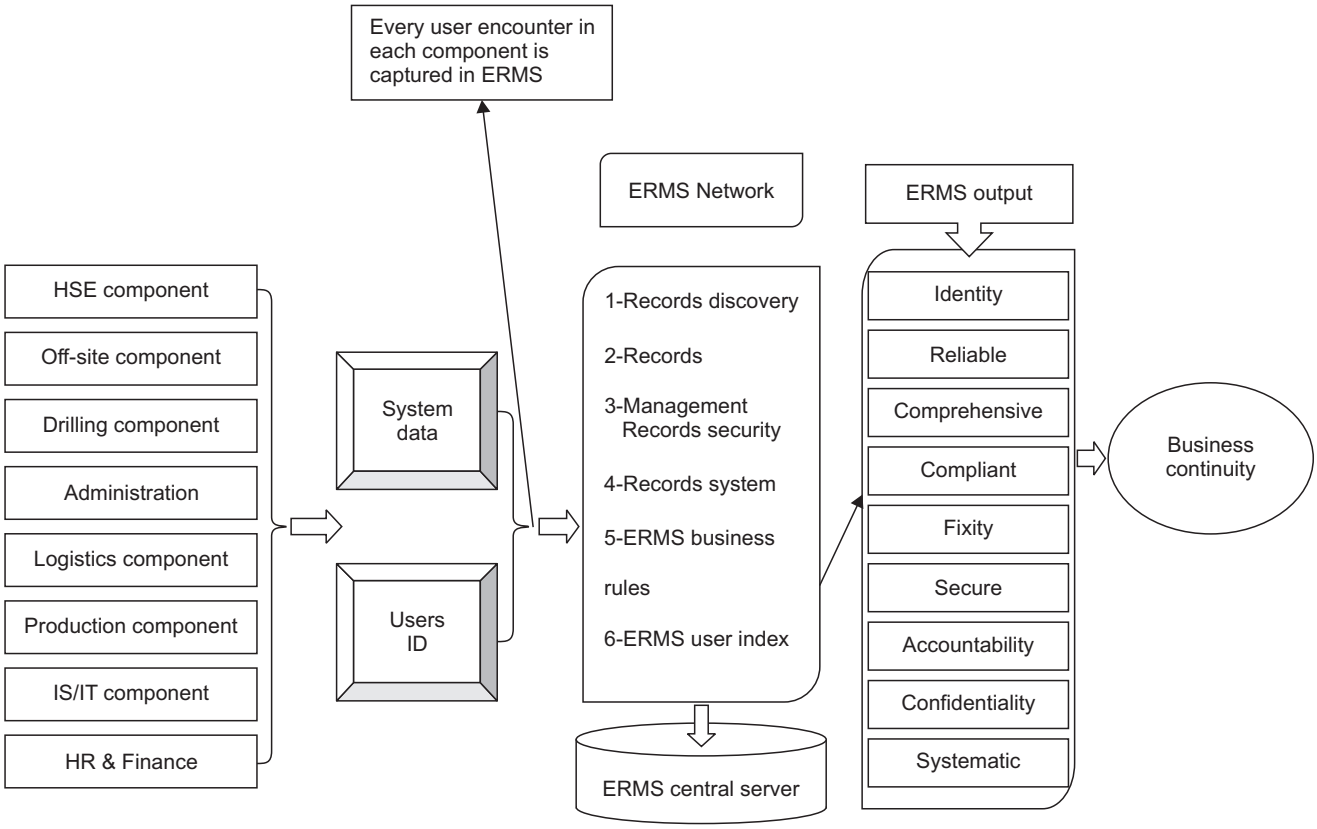

Fig. 1. Overview of electronic records system component in oil and gas sector, ISO/TR 21965:2019. ERMS, electronic records management system; HSE, ealth, safety, and environmental.

4. CHARACTERISTICS OF OIL AND GAS ORGANIZATIONS IN YEMEN

Yemen, as a Middle Eastern country, lies in a strategic location from the perspective of international trade routes. The country benefits from its vicinity to Babul Mandab, the Aden Gulf, the Red Sea, and the Arabic Sea as the main sea routes for international trade. The oil and gas sector is one of the most important sectors in many developing countries including Yemen, a country with unstable law and order conditions that is making gradual but primitive ventures into oil refining. Yemen is producing oil and gas to support the economy of the country. The oil and gas sector is supervised by the Ministry of Oil and Minerals (MOM). The functions of MOM are to provide policies and manage relations with foreign operators (Kassem et al., 2019; Ngoasong, 2014). There are two corporations operating in Yemen and they are the National Oil Company and the Yemen General Corporation for oil, gas, and mineral resources located in the capital city. These corporations have their own subsidiaries such as Petroleum Products Distribution Company, Yemen Gas Company, Aden Refinery Company, Petroleum Exploration and Production Authority, SAFER Exploration & Production Operations Company, Yemen Investments Company for Oil and Minerals, and Yemen Refining Company located in other cities throughout Yemen.

In Yemen, the Public Telecommunication Corporation (PTC) began implementing e-Government in 2009, which includes ERMS implementation. The Chinese government has pledged to provide the equipment and technical support necessary for setting up the required information and communications technology (ICT) with training and after-installation service support. Following the success of ERMS implementation in the PTC, the oil and gas sector is attempting to replicate this success but still requires technical support and relevant knowledge. ERMS adoption will also help the oil and gas sector to protect against information loss in the event of natural disasters, such as flood, tsunami, and earthquake.

Table 1. Description of functions of ERMS components in the oil and gas organization

ERMS component	Function	Benefits to business continuity
HSE component	Recognize and control hazards. Approve all work permits in the field. Give all employees training about safety and risks. Provide personal protective equipment	Keep the oil and gas sector work safely. Avoid any risk could cause a stop of the business
Off-site component	Protect and secure records or information from misuse or accidental destruction	Help authorized user to track information down quickly and efficiently during any emergency
Drilling component	Manage drilling data, wells monitoring system, mudlogging system, off-line data analysis, log drawing and reporting	Keep the drilling site active that help the oil and gas sector continue exploring and production oil
Administration component	Include all records and reports required by oil and gas sector regulations which shall be accessible at any time to the administrator	Manage the availability of information permanently or temporarily until the normal operations are resumed
Logistics component	Contain rigs material information, pipelines data, inventory, and production activities. Safeguard business information assets in all formats	Enhance the process of remotely accessing critical information that will quickly give users the access to crucial documentation they need
Production component	Provide organization with daily wells production records, export reports, production data mapping, data normalization, system evaluations, and daily production system operations	Improve efficiency of production operations and activities. Digitize all transactions that was done manually which enhance business continuity
IS/IT component	Manage, monitor all information systems and ICT activities in the OIL AND GAS sector including the management of records. Maintain e-mails in whole organization	Keep organization updated with all new systems and back up records for off-site used. Assess the potential for digital transformation initiatives
HR & Finance component	Maintain employee records with industry regulations. Manage fiscal and payroll system. Handle Performance Management, Retirement/ Termination, and training Documents	Store records in an electronic repository in a systematic way. allows to find and access the information that the emergency team need more efficiently

ERMS, electronic records management system; HSE, ealth, safety, and environmental.

5. DIGITAL DEVELOPMENT IN THE OIL AND GAS SECTOR

The oil and gas sector relies on ICT to conduct its business and uses information systems, big data, and other digital innovations to support its business and operations. In the early 1980s, oil and gas corporations began to adopt digital technologies, with a focus on the best software and systems used in drilling, reservoir services, and production departments. They also looked at technology that would ease HSE and enhance business continuity in developed and developing countries. A wave of digitalisation swept across the sector in the 1990s, bringing with it many new systems (Gezdur & Bhattacharjya, 2017). However, the sector has yet to take advantage of the opportunities that have arisen from the use of data, electronic records systems, and other technologies in a significant way. A particular drilling rig in an oilfield, for example, can generate a tremendous amount of data daily. However, only a small portion of this is relevant to decision-making and business continuity (Hawash et al., 2021).

The ERMS should be a part of daily routine and practice in oil and gas organisations. Many oil and gas organisations still do not use an ERMS to manage vital records due to a lack of knowledge of the significance of the system. The nature of work in the oil and gas sector is considered multifarious and structured across all sectors, with a need to incorporate new technology as soon as it becomes available. The ease with which the data can be monitored, maintained, and audited is critical in continuous development such as this, in relation to consolidation, milestones, and the myriad of difficulties that arise in factories, pipelines, land management, and development activities. The full scale and amount of infrastructure that is needed is indeed a unique obstacle faced in maintaining data. The massive, interconnected gas pipeline network

in the US, for example, consists of approximately 2.1 million miles of distributive and utility pipelines (Hawash et al., 2020a). Nearly a quarter of all US electricity is created using natural gas. These natural gas pipelines are supplied via direct supply lines from the local distribution companies to homes and other companies. Taking into account the large amount of varied information they deal with, oil and gas corporations should integrate a records management framework to minimise or avoid risk and to remain competitive in an unstable market.

The digital transformation of energy infrastructures has encouraged consumers to look at alternative sources and suppliers of energy, and has led them to support creative energy optimisation and marketing models. The oil and gas sector must consider the full effects of these developments in the wider energy market to remain competitive choices for consumers. Digital strategies describe the innovations that are intended to have profound effects on the supply chain of the industry, its employees, its related sectors, the climate, and the community (Devold et al., 2017). These efforts represent specific actions that companies should take when they use emerging technologies, such as ERMS, to change their market and business models, as shown in Fig. 2.

Consequently, the digitisation of records and information in the oil and gas sector has led organisations to continue working towards successfully implementing a records management policy. Such policies have been created to control the use of electronic records in government sectors, including the oil and gas sector (Devold et al., 2017). Therefore, public sector data and information need to be managed efficiently and holistically, and data sharing across the sector needs to be strengthened. In this regard, the adoption of an ERMS is a key initiative in realising these efforts. The adoption of an ERMS has a huge impact on an organisation's management and decision-making capabilities, providing records electronically that are available anywhere and at any time. This effective service further contributes to improving public service delivery. The incomplete use of ERMS, however, has negatively affected organisations' management of electronic records, and has adversely affected the oil and gas sector in Yemen (Hawash et al., 2020a). Adopting ERMS completely can enhance the performance of records management, thus creating a positive impact on organisational performance and business continuity. Therefore, the adoption of an ERMS needs to be coordinated and well managed to ensure that this initiative is accepted at all levels of users.

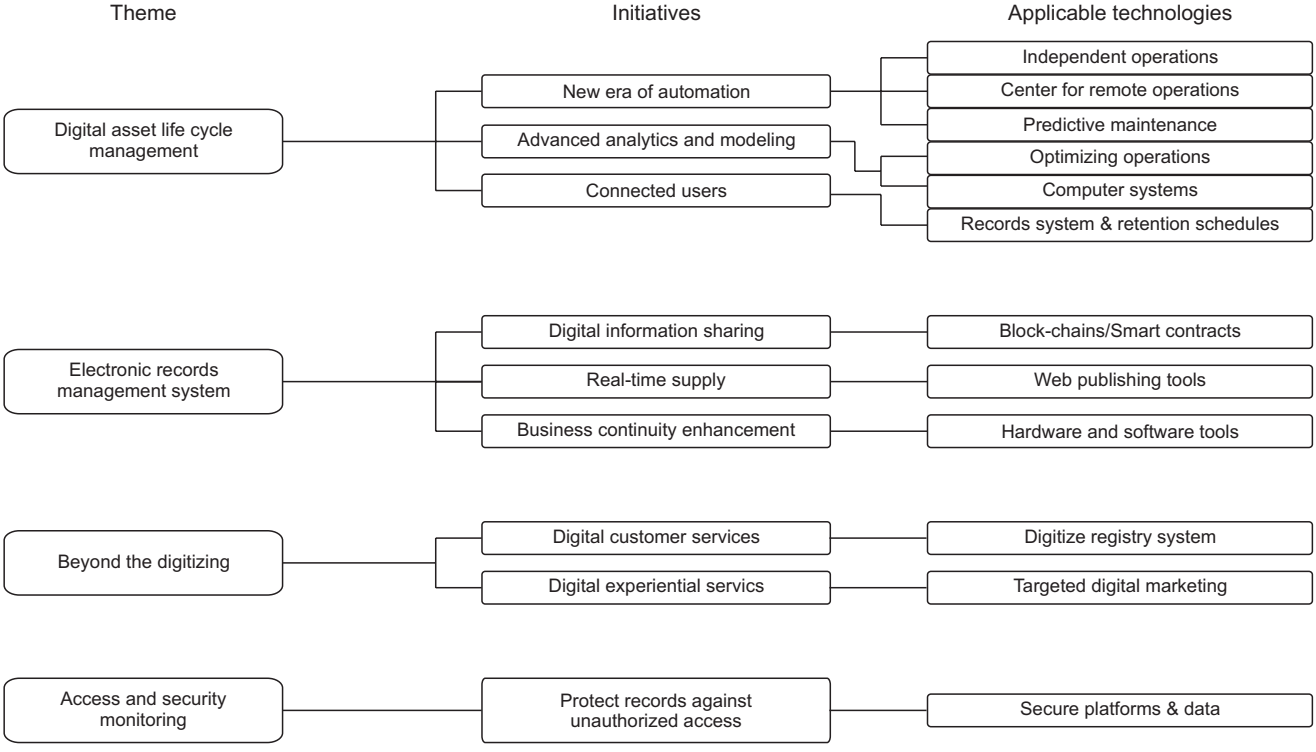

Fig. 2. Deployment of digital technologies in the oil and gas organization. Source: World Economic Forum.

6. ELECTRONIC RECORDS MANAGEMENT SYSTEMS USAGE AND BUSINESS CONTINUITY

An ERMS is important to support business continuity by identifying and managing current and future threats to records in the organisation (An & Wang, 2010). According to Sittig et al. (2014), many organisations have specified that the adoption of a new system, such as an ERMS, will improve or replace their current plans for business continuity. Organisations use various methods to support business continuity, such as protecting records and information from change or destruction by unauthorized users. However, these methods tend to be unprotected, archival, and particularly vulnerable to fire, overflow, and loss. Part of a company's top management's role is to mitigate or avoid the effects of a records-related disaster by identifying and protecting records deemed vital to the organisation. They must provide a secure environment for existing records and ensure their preservation. Hence, organisations, including those in the oil and gas sector, should adopt an ERMS to resolve these issues and to ensure that information survives disruptive events. The information in these records is important for business continuity and should be protected using a rigorous system (Ballmert, 2017).

Organisations have recognised the significance of electronic records in supporting management in revealing uncertainties that could lead to poor fiscal developments and social environments. In this context, electronic records are significant assets because they contain information considered essential to supporting business continuity (Jorrigala, 2017; Spremic et al., 2018). Records management is becoming more important in enabling organisations (both public and private) to deal with business challenges both internally and externally, thus supporting their business continuity. Therefore, organisations should identify and measure information assets, as well as electronic records, in order to improve their efficiency and effectiveness (Eroğlu & Çakmak, 2020). During emergencies, the organisation should know the details of the arrangements made to access records, which can easily be done through an ERMS. An ERMS supports the protection of these records, plays a critical part in ensuring the continuity of operations, and ensures that all organisational information is properly maintained and accessible when needed (Nyampong, 2015). An emergency team should swiftly access the electronic records that are required for continued business operations during a disaster, which can be done easily via an ERMS. These records, when managed properly, survive without any deletion or modification. During a disruptive event, there is no time to check the contents of these records. Any potential issues that could arise because of such an event can be resolved by using an ERMS.

Oil and gas organisations should use an ERMS to house their records and facilitate the effective operations of the organisation during its daily operations. In the event of a disaster, the content of records should be available, without any changes made to them, in order to guarantee the validity of records (Turton, 2017). Organisations that still use manual records management to save records in different places find that they are difficult to trace during an emergency (Luyombya & Bukirwa, 2014). The loss of any record can seriously undermine credibility, which reveals the urgent need to protect records that contain vital information. The use of an ERMS helps organisations arrange their records based on their business continuity plan or strategy (Akotia, 2016). Every organisation should create the necessary rules or guidelines for implementing an ERMS in line with the organisation's operational objectives, and ensures there is an appropriate management that avoids any business disruption if the information is lost.

Previous studies have indicated that an ERMS enables organisations to accumulate, recover, and disseminate secure information. In certain cases, an ERMS seems to be more functional for quick access to documents and for defining business continuity requirements (Marutha, 2019; Marutha & Ngulube, 2018). An ERMS enhances records protection, minimises record broadcast delays, facilitates the finding of records, and prolongs the lifecycle of records. Furthermore, an ERMS minimises issues related to records misplacement, and ensures business continuity in organisations (Turulja & Bajgoric, 2018). Thus, the use of an ERMS supports business continuity in the oil and gas sector in Yemen by guaranteeing the accuracy and availability of records during any disruptive event.

7. OPPORTUNITIES OFFERED BY ELECTRONIC RECORDS MANAGEMENT SYSTEMS IN THE OIL AND GAS SECTOR

An ERMS allows users to electronically save, keep track of, recover, share, issue, and maintain records throughout their lifecycle. The records system is a complete system covering the entire scope of organisational business activities (Nguyen et al., 2016). Thus, an ERMS should fulfil organisational or industrial legal requirements to be trust-

worthy, complete, accessible, legally sound, and robust. Hence, an ERMS ensures suitable security. An ERMS is considered in many organisations as a vital tool for optimising the security of records and the quality of the business (Mosweu, 2020). The adoption of an ERMS enables oil and gas organisations to operate faster by allowing ease of access to all records. Records need to be kept safe, accessible when needed, and be used in an organization (Luyombya & Bukirwa, 2014). The oil and gas sector needs to record many reports, which are currently stored throughout its organizations, digitised, and uploaded onto an ECMS in order to obtain the maximum value from the sector's investment. Using information in an organised manner will assist this sector with compliance with regulations, requests for information, and efficient processing. This can be achieved by adopting a sound electronic records system, such as an ERMS, to accelerate the growth of the sector.

Moreover, the adoption of ERMS in the oil and gas sector will lead to improvements in operations that will generate the most revenue for the country. It will also increase the level of awareness among its employees regarding the importance of business continuity in this sector. Furthermore, it will protect records that contain important information related to the production of oil and gas. Such crucial information should be saved as confidential information (Adam, 2007; Ambira, 2016). Despite its effectiveness, however, ERMS adoption remains low in the oil and gas sector in developing countries.

In the global oil and gas sector, ERMS are important for managing a large number of records. These records are generated on a daily basis to help organisations achieve their goals. An ERMS effectively implements regulations concerning the oil and gas sector, thereby reducing costs and increasing competitiveness. Thus, ERMS help the oil and gas sector to meet policy requirements for information management and fulfil external regulatory needs. Moreover, ERMS increase the efficiency of record keeping in the oil and gas sector, help make them compatible with regulations, and decrease the likelihood and impact of litigation. ERMS manage the creation and upkeep of electronic records to facilitate organisational operations (Taiwo, 2019).

There are significant opportunities and potential future gains for ERMS, according to the National Archives of the USA (2016). Private and public sector organisations have both gradually had to improve data storage, largely due to the introduction of various regulations and legislations that apply to reliable records. The role of records management has thus shifted from the fringes to the centre of corporate culture. Therefore, the adoption of ERMS in the oil and gas sector has many benefits (see Table 2).

Table 2. Benefits of ERMS

No.	ERMS benefit
1	Improving an organizations workflow, and providing evidence of business activities
2	Enable automation and monitors records throughout the lifecycle
3	Supporting decision making
4	Enhances records security and integrity
5	Assists in disaster recovery
6	Improving transparency and accountability
7	Eases of sharing information and ease of access to the information during an emergency
8	Provides retrieval history of managing records by tracking all access to records
9	Ensures that only authorized users and administrators can change the content of records
10	Supports and be compatible with the organizational classification scheme
11	Supports for evidence-based policy
12	Supports archives and records management legislation

ERMS, electronic records management system.

8. ENABLERS OF ELECTRONIC RECORDS MANAGEMENT SYSTEM IMPLEMENTATION IN DEVELOPING COUNTRIES

In developing nations, the introduction of ERMS in the oil and gas sector is associated with management, enhanced policy decision-making processes, and financial assistance related to acquiring IT and communication, as well as improving digital technology. In developed countries, ERMS capabilities encompass law, financial investment, workforce recruitment, leadership, technological appropriateness, expectations of success, and social impact (Bunawan et al., 2014; Mukred et al., 2019a). The following subsections provide more details on the enablers of ERMS in the oil and gas sector.

8.1. Legislation

In the field of information management, oil and gas organisations have specific laws, regulations, and protocols that apply to them, including the Government Management Operational Policy, Monetary Administrative Operational Policy, Operational Records Classification Systems, and Administrative Records Classification Systems. Within this regulatory and policy framework, every mechanism for the handling of documents must function in an approved manner. There are many examples of these legislations in developing countries, such as the National Archives and Records Service of South Africa, the National Archives of Turkey, and the National Archives and Records Management Policy in Malaysia. These legislations represent laws, policies, practices, and standards that define the position of state, regional, and local administrations in terms of the implementation of records management systems (Netshakhuma, 2019). Managements in developing countries have encouraged the adoption of electronic record technologies in order to support operations and business continuity.

8.2. Fiscal Assets

Many developing countries need to support fiscal assets and develop fiscal records in relation to security and confidentiality. For example, a study conducted in Turkey recommended the adoption of ERMS to support sufficient financial resources for procurement requests in order to remove the gap between records management and assets. Another study touched on the need for an ERMS in relation to the sustainability of electronic medical records systems (EMRSs) in southern Africa, and revealed that funding EMRSs (e.g., IT infrastructure, employment of staff, and operating costs) is important. In Uganda, collaboration between service providers and record managers has been confirmed to be happening (Luyombya et al., 2018). This effective collaboration can result in successfully implemented systems. This approach can help mitigate the common challenges encountered by ICT implementers in developing countries.

8.3. Staff Training

Training is extremely important for all organisations because it provides knowledge and skills to the management and staff of the organisation with regard to new techniques, systems, and technologies (Salimans et al., 2016). In this study, training is related to practising ERMS skills that should be studied by oil and gas employees in order for them to use the system effectively. Training for users will increase their general understanding on the uses of an ERMS. Thus, the emphasis should be on facilitating usage, including correct IT set-up and familiarisation with the ERMS to enhance employee adoption of the ERMS. The need for continuous training in how such a system works is necessary to avoid failure of the systems implementation. Moreover, an ERMS is an automated system that needs new specialists to use it. Thus, employees should be trained properly to avoid the failure of system integration. Any delay in considering and providing training to users could adversely affect the use of the system to achieve organisational objectives (Mosweu & Kenosi, 2018).

8.4. IT Personnel

Effective IT personnel can dramatically improve the success rate of using ERMS in the oil and gas sector. Many organisations depend on ERMS experts who have a deep understanding of managing data electronically. In developing nations, however, most ERMS studies have either addressed the preparation or evolution of valuable requirements needed for electronic data processing, examined long-term strategies for electronic records preservation, or created best-practice guides to assess the utility of the ERMS adopted by companies (Hawash et al., 2020c; Mukred et al., 2019c). Almost all of the ERMS studies in existing literature have adequately addressed construction professionals, IT staff, IT administrators, and IT experts. In leading advocacy countries, such as Australia, the UK, and the US, IT leaders and experts have contributed significantly to the concerted endeavours to resolve ERMS problems and concerns (Currie & Spyridonidis, 2019; Jo-

hare et al., 2013).

In developing countries, IT personnel can be a significant factor in ensuring the effective implementation of ERMS in oil and gas organisations. The key is to ensure that a relevant system is in place, accompanied by related policies and procedures on its use. Involving IT experts in ERMS implementation or adoption is essential, and increases cooperation between both records administration and IT players to maintain the widest interpretation of specifications and optimisation of the advantages of deployment. The business models and technological criteria of the individuals using the platform are important and must be integrated into the requirements. This helps the project, including the architecture and system setup, and especially the user interface, creation of business rules, work area preparation for ERMS deployment, skill gaps, knowledge sharing, and communication policies.

8.5. Acceptability of Technology

Many researchers have shown that acceptance of technology is influenced by several factors, such as IT knowledge levels, benefits offered by the new technology, and fears that the new technology may be difficult to learn (Skoumpopoulou et al., 2018). Recent studies have revealed that the adoption of new technologies, such as enterprise resource planning systems and ERMS, by oil and gas sector personnel in developing countries, can be influenced by the level of the system's ease of use (or simplicity) and end-users awareness (Azima et al., 2019; Rafique et al., 2020). User satisfaction is also a significant determinant in the introduction, deployment, and use of IT in an organisation, as the degree of user satisfaction with a recently introduced system determines the success of using any new technology.

9. CONSTITUTION OF ELECTRONIC RECORDS MANAGEMENT SYSTEMS

The aim of records management is to have proof of commercial operation when necessary, in order to avoid any legal problems. This can be handled by generating the contents of records as contextual information (metadata), protecting the records that are used by an organisation to support its operation through supporting the legitimacy and accuracy of information and imposing a retention process (Alalwan et al., 2017, 2018). For an ERMS to function correctly in an organisation, administrators and IT experts must be involved in managing the records together in order to apply an ERMS completely, thus encompassing all the processes in the company (Campbell, 2016).

An ERMS receives and manages records that can be imported from an EDMS or an enterprise content management (ECM) system to deliver a complete solution (Nguyen et al., 2016). An ERMS facilitates decision-making by recording, collecting, and enhancing the efficiency of company operations (Katuu, 2016). The main function of an ERMS, as required by the management, is classifying, storing, and retrieving records that the organisation needs to keep for future use. Furthermore, an ERMS supports the philosophy of records management because it has the ability to capture, describe, manage, store, and dispose of records in an electronic format. An ERMS supports the retrieval process of electronic records from the place where they are stored based on accepted principles (Ambira et al., 2019). ERMS were developed based on early computerised practices of the management of hard-copy records, while EDMSs were developed from software intended to manage basic documents, subsequently becoming a computerised technique for managing large volumes and categories of documents, such as process instructions (Chang et al., 2020; Xue et al., 2019).

Nguyen et al. (2016) found that ERMS and EDMSs accomplish distinctive tasks, such as retrieving, viewing, and printing records and documents simultaneously. An EDMS creates, edits, modifies, deletes, or saves documents. Subsequently, protected documents can be reformed as records, and duplicate copies of these documents can be transferred into an ERMS, which protects them from being edited, altered, or deleted (Katuu, 2018). Neither ERMS nor EDMSs fully fulfil the requirements of handling the whole lifecycle of a document. Nevertheless, the additional method of combining an EDMS and an ERMS ensures that information, including e-mails, can be recorded. According to Azima et al. (2019), merging the functionality of an EDMS with the requirements of an ERMS enables the reuse of electronic information, and ensures the integrity and retention of electronic records. Therefore, the combination of an ERMS and an EDMS leads to a new system, called an EDRMS, which is considered supportive.

The ECM Association and the Association for Information and Image Management define an ECM as the technology used to capture, manage, store, preserve, and deliver content and documents related to organisational processes. ECM tools and strategies allow for the management of an organisation's unstructured information, wherever that information may exist. EDMSs may be more suitable for some public sector organisations, whereas

ECMs may be more suitable for content management (Jaakonmäki et al., 2018). However, ERMS include features such as rigorous retention controls, historical logging, and archive transfer and destruction, making them more suitable for the oil and gas sector. Furthermore, ERMS are the most effective systems for oil and gas organisations in developing countries because they can easily communicate with their existing records management software. In particular, the processes of classification and retention can be assessed in line with the organisation's governmental requirements (Nguyen et al., 2016).

10. FINDINGS AND DISCUSSION

The narrative review revealed potential for IT professionals to present opportunities for ERMS use, both in public and private sectors, including the oil and gas sector, in developing countries. It also categorised and identified obstacles to ERMS implementation in the oil and gas sector that need to be discussed before developing the system in order to guarantee success. The key success factors of ERMS implementation are the users, managers, and IT experts who are demonstrating the success of the ERMS role in employing system demand and supply principles for decision-making and business continuity. The presented literature revealed that organisations need to understand the characteristics of ERMS to ensure their efficiency and effectiveness. Hence, the study identified key stakeholder roles and responsibilities needed in the implementation of the ERMS for managing records and supporting business continuity during crises, such as the present pandemic, in developing countries.

The narrative review undertaken in this study reveals that, in the event of a risk or crisis, staff need to have easy access to their records and documents to remain productive. An ERMS allows staff to remain active and work off-site, while protecting the organisation's content through the monitoring and control of authorisations. Contemporary ERMS support the creation of methods and work processes for off-site operations. Throughout a crisis, users or managers are able to build and create their processes electronically or through digital systems that lead to quicker recovery times and compliance monitoring, even for office staff. This promotes market management and the effective delivery of services even during disturbances.

As a result, ERMS can capture and create records and information that need to be documented and replicated in a safe manner. Major failures are unlikely to result in substantial data loss if ERMS-based catastrophe response processes are in place. ERMS enable easy integration with organisations' servers and platforms, enabling managers to support business continuity objectives. Therefore, the records included in the plans for business continuity are supported through ERMS. Users find it useful if all parts of a business continuity plan are in a single document for ease of reference. Thus, this study reveals that ERMS guarantee the obtainability, in all situations, of data critical to the rebuilding of an organisation's vital current records and archival records.

ERMS have the ability to systematise records, increasing transparency and accountability in relation to important information. The system provides consistent and strategically captured information with which to enhance business continuity. In other words, ERMS should be the basis for productivity as effective measures to support business continuity in oil and gas organisations. Additionally, electronic records have the ability to support transparency and accountability when they are managed systematically.

This study has verified that ERMS adoption would assist top management in the oil and gas sector in updating plans in order to protect information and records during disruptive events. This would enhance business continuity by keeping important information secure and easy to locate. This study assists records users, managers, and adoption teams by improving their understanding of the benefits of, and incentives for, using an ERMS. The findings of this study help shape practical awareness and improve the planning documents, which could help the oil and gas sector ensure employee satisfaction with ERMS services in supporting business continuity. The practice and use of ERMS will change records management from manual to systematic, which is considered to be of critical importance in the reviewed literature.

11. THE USE OF AN ERMS IN THE OIL AND GAS INDUSTRY IN DEVELOPING COUNTRIES DURING THE PANDEMIC

Oil and gas firms are being affected by the demand disruptions caused by the COVID-19 outbreak and the current market oversupply (Indupurnahayu et al., 2021; Norouzi, 2021). This has resulted in many changes in the way work is being conducted, and has forced organisations to shift their activities from physical to online processes, which can be carried out from home. The oil organisations affected have created many digital and electronic records during this time, which need to be accessed through

 https://doi.org/10.1633/JISTaP.2022.10.2.3

the system. ERMS is beneficial in managing these records online. As a result, ERMS supports the new processes that are being conducted during this pandemic. The combination of digital, cloud computing, and the new normal in oil pricing has set the stage for a tremendous revolution in the oil and gas sector. With the magnitude of oil and gas operations, even small changes have significant effects. This has been proven by oil and gas businesses exploiting developments in digital technology throughout the value chain, and the following sectors having the potential for larger influences as a result.

The use of an ERMS enables oil and gas organisations to digitally transform business processes during a pandemic and enables users to work and collaborate regardless of their locations. With many employees operating from home, remote access to data and documents is critical. Compliance and security need special care. Particular attention should be paid to roles and permissions in an organisation's records management system. Additionally, storage concerns, a lack of automation, inadequate backup records, and readiness to accept change may need to be addressed.

12. CONCLUSIONS

This paper has used a narrative review to provide an overview of the existing ERMS literature, with an emphasis on explaining the characteristics and main components of ERMS and presenting evidence regarding the implementation of ERMS in the oil and gas sector in developing countries. The advent of ERMS has digitalised oil and gas data by transforming records management systems from manual to electronic devices. However, ERMS use in developing countries is still limited, despite the large generation of records in these settings. ERMS implementation facilitates the trend of digitalisation that will enable the oil and gas sector to progress to the future, and help respond to their needs, particularly during the current COVID-19 pandemic. Successful ERMS implementation requires commitment from top management and IT leaders in terms of policy directives, source enrolment, and evidence-based decision-making. This study contributes significantly to the field of ERMS application, motivating management in the oil and gas sector to focus on the digitalisation of their information, which is created daily, in order to support business continuity.

ACKNOWLEDGMENTS

This study was supported by the Universiti Kebangsaan, Malaysia, Grant (GUP-2019-061). The authors thank the editor and anonymous reviewers of this journal for their productive comments to develop the paper.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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JISTaP http://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 10(2): 45-73, 2022

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2022.10.2.4

Analysis on Literature Review of Internet of Things Adoption Among the Consumer at the Individual Level

Arif Mahmud*
School of Computer Sciences, Universiti Sains Malaysia, 11800 USM Penang, Malaysia
E-mail: arif.mahmud@student.usm.my

Mohd Heikal Husin
School of Computer Sciences, Universiti Sains Malaysia, 11800 USM Penang, Malaysia
E-mail: heikal@usm.my

Mohd Najwadi Yusoff
School of Computer Sciences, Universiti Sains Malaysia, 11800 USM Penang, Malaysia
E-mail: najwadi@usm.my

ABSTRACT

The research in the literature review on Internet of Things (IoT) adoption from an individual consumer viewpoint is minimal and has not yet been fully investigated. Therefore, the objectives of this study are to analyze the growth of IoT in recent years and to conduct a weight analysis of the factors that affect acceptance intentions and real usage of IoT-enabled services. For the review, we analyzed 87 publications from 13 conferences and 54 journals published during the period 2014-2020 about consumer adoption of IoT. Following the study, we discovered an unprecedented increase in the number of articles published in the last seven years, which points to an emerging area with an enormous prospect. Furthermore, the weight analysis outcome was associated with the diagrammatic representation in this study. After that, this research developed a generalized consumer IoT adoption model based on the 12 best predictors derived from frequency count and weight analysis, which had the highest predictive power for calculating IoT adoption. This paper further acknowledges the study's theoretical and practical contributions, as well as its shortcomings, and proposes further research directions for future researchers.

Keywords: diagrammatic representation, individual-level, internet of things, systematic literature review, weight analysis

Received: January 10, 2022 **Revised:** May 1, 2022
Accepted: May 15, 2022 **Published:** June 30, 2022

***Corresponding Author: Arif Mahmud**
https://orcid.org/0000-0002-1029-0166
E-mail: arif.mahmud@student.usm.my

1. INTRODUCTION

The number of Internet of Things (IoT) devices is rapidly increasing (Saleem et al., 2018). Almolhis et al. (2020) backed up this conclusion, adding that the rapid rise of IoT technology has the potential to affect all aspects of human life. Essentially, the manufacturing and industrial sectors are driving this IoT expansion. Nonetheless, the growth from a research standpoint has not been widely explored. The number of publications on IoT is rising, according to Kotha and Gupta (2018). They did not, however, present any proof to back up their assertion. On the other side, if this fast expansion is not adequately addressed, IoT might pose issues in terms of interoperability, communication, data processing, integration, security, and privacy (Saleem et al., 2018). Even though research in IoT-related domains began in 2008 throughout the world, the rise was seen after 2013 in numerous high-quality journals listed on the Web of Science, Scopus, and other databases (Mącik, 2017). As a result, in order to examine current developments, the research needs to look at publications published after 2013.

Nonetheless, research on individual consumers' perceptions about IoT adoption is currently lacking in the IoT literature, which focuses more on the technology aspect (AlHogail, 2018). Understanding customer acceptability has become a must for bringing IoT solutions into everyday life. Because the IoT is still in its early phases, only a small amount of interest has been paid from the standpoint of individual consumers (Lee & Shin, 2019). Individual acceptability, according to Kim and Kim (2016), is one of the barriers to IoT technology innovation that must be addressed. This argument is backed up by Hsu and Lin (2018), who have also pointed out that influencing factors of IoT applications and services have received little attention. On the other hand, deciding whether to go with a generic or specific model is always a challenging issue (Fahmideh et al., 2020). In any case, a generic model is required to be developed in the IoT domain which will not be customized to any specific application. This generic paradigm, according to Attali et al. (2010), has major implications for acceptance since it allows for more meaningful interpretation. These models are also adaptable and transferable to other particular applications (Fahmideh et al., 2020; Rothgangel & Riegel, 2021).

Apart from this, according to Brous et al. (2017), despite the obvious prospects and optimism, IoT adoption remains low. Karahoca et al. (2018) have further added that the determination of influencing factors is vital to increasing consumer IoT adoption. In contrast, a systematic literature review (SLR) study is necessary to determine the influencing factors (George et al., 2016; Meng et al., 2021; Thuan et al., 2016). Notably, an SLR study provides a globally standard, accurate, and consistent literature review (Crocetti, 2016). Therefore, the purpose of this SLR is to enhance consumer IoT adoption by addressing the research gaps discussed above. On the other hand, the reason for performing weight analysis is that the weights represent an independent variable's predictive power (Jeyaraj et al., 2006). Moreover, weight estimation and meta-analysis have a closer relationship, since the larger the weight of an independent variable, the more likely it is to be significant when conducting a quantitative investigation (Rana et al., 2015). Therefore, this study's objectives are as follows:

1. To explore the growth of IoT among the consumer at the individual level during the period 2014-2020
2. To perform the weight evaluation of the variables that influence the adoption intention and actual usage of IoT applications
3. To develop a generic IoT adoption model derived from weight analysis

Thus, the rest of the sections of this article are organized as follows: Section 2 contains the fundamental information related to IoT adoption, weight, and their relationships. The methodology is outlined in Section 3 along with the entire review procedure. Following that, in Section 4 the study's findings are presented. Subsequently in Section 5, there is a discussion of the study findings. A conclusion remark, as well as the implications of this study withthe study's weaknesses and some ideas for future research, is included in the last section.

2. THEORETICAL BACKGROUND

To have a complete awareness of the target region, the following issues will be investigated. To be specific, in this section five topics will be discussed. A brief overview of IoT and its global acceptance will be explored first. Afterward, the weight calculation process will be briefly explained. Next, the relationships between IoT adoption and weight calculation will be depicted. Finally, review studies of IoT adoption will be explored.

2.1. Overview of IoT

IoT was initially formed using the idea of pervasive

 https://doi.org/10.1633/JISTaP.2022.10.2.4

computing proposed by Mark Weiser in 1991. Later on in 1999, Kevin Ashton first proposed IoT as a means of communication through RFID tags. Now, IoT is based on these two ideas to connect and create communication among every living and dead object (Chin et al., 2019). In the last 20 years, the application of IoT has become versatile and used in different sectors. Further, the definitions are noticed to vary in many papers based on the applications or topic of interest since no standard definition has been established yet (Sidek & Ali, 2019). However, according to Gubbi et al. (2013), such things are considered the dynamic participants in industry, knowledge, and social systems in which they can engage and connect. These IoT devices share data and information with their surroundings when autonomously responding to and shaping physical world activities by operating processes that cause acts and build resources with or without uninterrupted human interference. Later on, Saint and Garba (2016) argued that IoT is a digital network for the information association that allows progressive services through communicating with virtual and real entities based on current and emerging information and communication technologies.

2.2. Global Acceptance of IoT

In 2011, the number of IoT devices surpassed 7 billion global populations worldwide (Chatterjee & Kar, 2018). According to Gupta and Gupta (2016), the number of connected devices was 0.08 per person in 2003 and it became 6.58 in 2020, approximately. Interestingly, the number of IoT devices is observed to vary in different studies, which became approximately 24 billion (Gubbi et al., 2013), 28 billion (Chatterjee & Kar, 2018), and 40.9 billion (Harnessing the Internet of Things for Global Development, 2016) in 2020. Besides this, the market value of IoT hardware and applications was found as USD$10 billion and USD$70 billion in 2015 (Harnessing the Internet of Things for Global Development, 2016). Furthermore, IoT was rated as the most anticipated technology as per the Gartner hype cycle in the year 2014-2015, and still the domination over other technologies continues (Yasumoto et al., 2016).

Moreover, many IoT-based projects have been running worldwide, and only a few of them are as follows. First, we can name some of the IoT projects run by the EU such as IoT-A, Butler, IoT.est, RELYonIT, and IoT6 (Gazis et al., 2015). Second, the UK has funded an IoT innovation project worth £5 million (Li et al., 2015). Third, Japan has introduced "u-Japan x ICT" and "I plan" to implement IoT for all aspects of everyday life (Li et al., 2015). Fourth, Rwanda, Nigeria, Kenya, and South Africa are among the African countries that have already incorporated IoT into their national development plans (Saint & Garba, 2016). Last, worldwide recognized companies including IBM, Intel, Cisco, Qualcomm, Samsung, Microsoft, Facebook, HP, Amazon, Huawei, SAP, and Google are also involved intensively in this IoT evolution (Economides, 2017). Therefore, it is evident that many developed and developing countries along with organizations have realized the importance of IoT and have initiated several IoT-based projects for national and global development.

2.3. Overview of Weight

The weight can be defined as a predictive strength of an independent variable (Jeyaraj et al., 2006). It is determined by dividing the number of significant relationships by the total number of relationships. When we assign weight to a variable, that variable is assumed to be a weighted variable. To evaluate the weight, first we have to find out how many times a certain link between constructs has been studied, and then determine how many of these correlations are significant. The weight significance of a link between the constructs is calculated by dividing the second data value by the first. The value of weight '1' designates that the association between two constructs is significant in all papers whereas '0' specifies the association to be non-significant in all evaluated papers (Jeyaraj et al., 2006; Rana et al., 2015). Moreover, Jeyaraj et al. (2006) have divided the exogenous variables into two types, well-utilized (WUT) and experimental (EXPR). 'Well-utilized' is a variable that is evaluated five times or more during review and experimental variables are those measured less than five times. Some of the well-utilized variables are known as best-predictors (BPR) when their weight value is 0.8 or above. On the other hand, some of the experimental variables can be called promising predictors (PROM) when their weight value is 1. Notably, we will try to find the best predictors in this study to develop a new generalized IoT adoption model. Additionally, we will find promising predictors for further studies. Importantly, we cannot just declare the best predictor based on their weight values rather these values have to be well-utilized.

2.4. Relationships Between Weight and IoT Adoption

The concept of weight has been inherited from Jeyaraj et al. (2006) and Rana et al. (2015). In fact, an independent variable's predictive capacity in a particular relationship is assessed using this method (Jeyaraj et al., 2006). Researchers should identify convincing reasons to utilize such pre-

dictors within the model, according to Jeyaraj et al. (2006). On the other hand, IoT is now one of the most innovative and promising technologies. However, the IoT is arguably in its process of adoption (Basaure et al., 2020). Page et al. (2018) agree with this assertion, adding that consumer demand for IoT services is far lower than expected. As a result, if the influencing elements impacting consumer acceptance are not extensively identified, IoT technology will be neglected and advancement will be unsuccessful (Alkawsi & Ali, 2018). To improve adoption, it is crucial to understand customer approval and identify the elements that influence user adoption of IoT. This viewpoint is shared by Gao and Bai (2014), who urge greater study into the factors that influence individualconsumer acceptability of IoT devices.

Hence, we need to find out the factors that can assist people to adopt IoT-enabled services. Many researchers have used several theories and external variables in different IoT domains. However, the performances of these variables are seen to fluctuate based on the types of domains and applications. To illustrate, the relationships between the dependent and independent variables are not always significant in different IoT applications. Consequently, these independent variables cannot always perform as an efficient predictor of the dependent variables. Thus, the performance of each variable needs to be valued based on its performance. On the other hand, highly weighted variables (0.8 and above) have a high probability to become efficient predictors and their relationships can become significant as well. Rana et al. (2015) have also suggested assigning the weight to each variable so that their previous performance can be understood and their stability within the model can be confirmed. Consequently, this weight analysis can assist to find out effective factors that influence IoT adoption. Moreover, this analysis may be used as a reference for future constructs and can be further studied to show their performances (Rana et al., 2015).

2.5. Literature Review of IoT Adoption

The IoT has already gained interest from academicians, analysts, entrepreneurs, and practitioners due to its high potential (Suppatvech et al., 2019). Several review studies have been conducted to examine the notion of IoT in various fields. To illustrate, the majority of the review papers have focused on the adoption of IoT technology by organizations (Brous et al., 2020; Carcary et al., 2018). In addition, some of these papers reviewed particular IoT-supported applications and services. We can take cyber security (Lee, 2020), healthcare (Shah & Chircu, 2018), smart homes (Stojkoska & Trivodaliev, 2017), blockchain (Wang et al., 2019), education (Dominguez & Ochoa, 2017), and security (Ammar et al., 2018) for example. However, studies related to the literature review of IoT adoption targeted to individual consumers are limited and have not been extensively explored (Alkawsi & Ali, 2018). Only a few numbers of studies are identified to review the consumer adoption of IoT technologies (Al-Momani et al., 2019; Almomani & Rahman, 2022). These review studies, on the other hand, did not contain a weight analysis or recommend any factor that may aid in IoT adoption.

3. METHODOLOGY

In this study, the following steps (see Fig. 1) were followed as directed by Kitchenham and Charters (2007) and Ain et al. (2019). This study began by stating the research objectives and was completed with a discussion of the findings. In between, databases were selected, articles were searched, papers were filtered based on inclusion criteria, data were extracted from those papers, and results were demonstrated.

Since the context of this study fits our research, Alkawsi and Ali (2018) were followed to identify the literature databases for this investigation. In addition, these databases provide access to prestigious journals as well as high-quality andpeer-reviewed conference papers. Hence, the exploration was performed on five databases, ScienceDirect, Scopus, Google Scholar, IEEE Explore, and

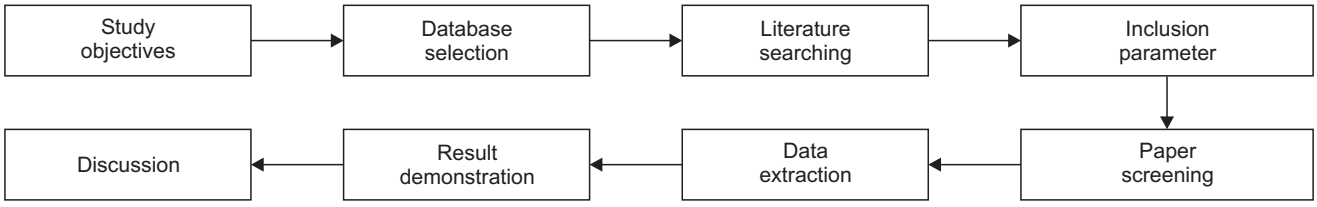

Fig. 1. Steps in the systemic literature review.

Taylor & Francis from August 5 to September 30, 2020. Our search was initiated for the papers associated with IoT adoption. Afterward, the following phrases and keywords were utilized: "IoT adoption," "IoT adoption intention," "IoT adoption behavior," "Consumer IoT adoption," "Consumer IoT model," and "IoT adoption model," in all possible permutations and combinations. Also, another keyword, "acceptance," replaced the word "adoption" in all cases. In order to address the three research objectives, the following inclusion parameter in Table 1 was followed. It is worth mentioning that based on these parameters, the articles were collected from the above-mentioned five databases.

All of the articles chosen for this study were empirically evaluated in the IoT area using a quantitative approach. General context materials, technical papers, articles written in languages other than English, articles focusing on the organizational viewpoint, periodical articles, etc. were

Table 1. Inclusion parameters

No.	Inclusion	Exclusion
1	Studied within the IoT domain	Studied outside of the IoT domain
2	Articles that were published between 2014 and 2020	Articles that were published before 2014
3	Articles that were written in English	Articles that were written in other languages
4	Only conference papers and journals	White papers, books, book chapters, editorials, review papers, etc.
5	Adoption or acceptance of IoT applications	Technical implementation of IoT-related applications i.e., algorithms, prototype development, etc.
6	Only the quantitative, full length, empirically verified articles from structured equation modeling	Only pilot test, pre-test, conceptual models, technical models without structured equation modeling

IoT: Internet of Things.

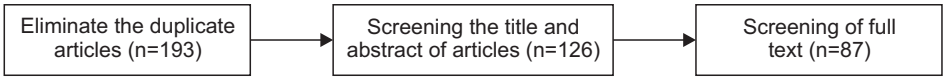

Fig. 2. Stages for article screening.

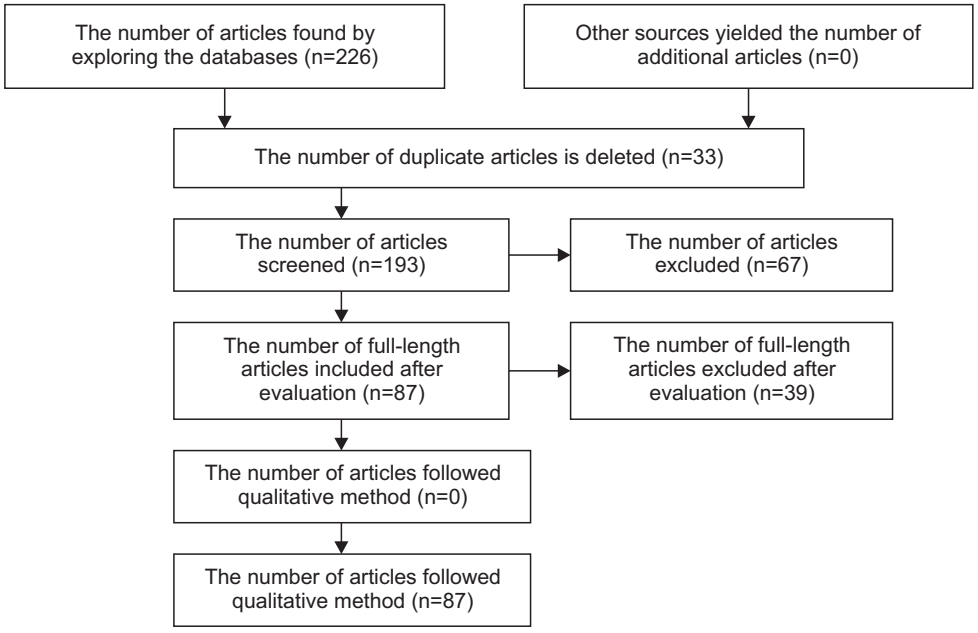

Fig. 3. The flow diagram.

Table 2. Fields included for data extraction

Serial	References	Authors	Year	Journal/ conference name	Theory/ model	Country	Sample type	Sample size	# Of citation	Dependent variable	Independent variable	Application	Category

filtered out. Afterward, based on the recommendations of Suppatvech et al. (2019), the 226 downloaded papers from the above-mentioned databases were screened in these three stages (see Fig. 2). Through these steps, duplicate articles were removed from the downloaded articles. Next, these papers were screened through the support of paper title, abstract, and full text.

Here, 'n' denotes the number of articles that were accepted after each stage. At the accomplishment of screening, 87 papers were selected for SLR from 13 conferences and 54 journals. The flow diagram can be found in Fig. 3. This flow diagram demonstrates the procedure of how the 87 articles were selected for analysis from the initial discovery of 226 articles. This diagram further explores how the desired articles were confirmed after each step of selection.

Finally, this study followed two types of analysis procedures. These are descriptive exploration as advised by Suppatvech et al. (2019), and weight evaluation as suggested by Jeyaraj et al. (2006). To illustrate, the descriptive analysis focused on the classification of papers according to the name of authors, their countries, publication year, journals, sample type, dependent variables, independent variables, etc. On the other hand, weight evaluation of the variables was performed using the procedure explained in Section 2.3. In order to perform these analyzing procedures, data were extracted from the 87 papers using an Excel worksheet. Afterward, the frequency of the variables from different theories and models was counted. Notably, the figures and tables of the next section were achieved based on the data extracted from this Excel worksheet. The fields used in the Excel worksheet are shown in Table 2.

4. RESULTS

Interesting insights into publishing patterns were found in the quantitative review of the articles.

The upsurge in the number of articles published during 2015-2018 is shown in Fig. 4. The highest number of papers is found during these two years 2018 and 2019, which accumulates 57.47% of total papers. However, no accurate picture is observed for 2020 from the graph since paper

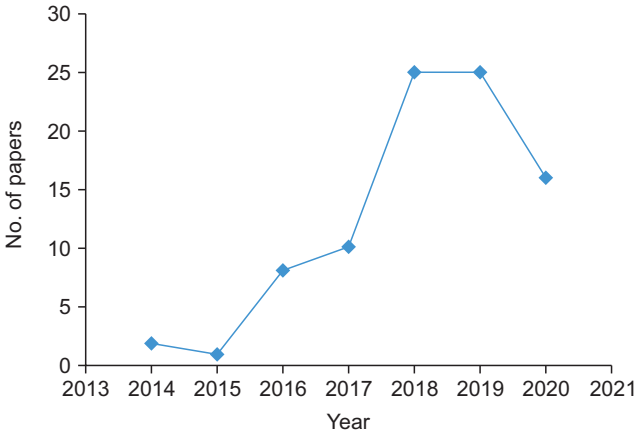

Fig. 4. Number of articles published per year during 2014-2020.

searching activities were completed at the end of September 2020 and no paper in 2020 has been contributed yet by the conferences. However, we can observe a more narrative picture in the distribution of journals across these years in the following table (see Table 3).

A total of 87 articles are distributed in 54 journals and 13 conference papers. As is seen from Table 3, all of the 13 conferences and the majority of the journals only have one paper. Importantly, the top four contributing journals are *Telematics and Informatics* (5 papers), *Technological Forecasting & Social Change* (4), *Behaviour & Information Technology* (4 papers), and *Computers & Security* (3 papers). In addition, the top 12 journals in this list have provided 32 articles, which are 36.78% of the total papers. Interestingly, no paper in 2020 is contributed yet by the conferences. In addition, we have found several theories and models in those journals and conference papers (see Fig. 5).

All the articles were categorized according to established theories and models. Notably, the extensions of models like the technology acceptance model 2 (TAM 2), technology acceptance model 3 (TAM 3), unified theory of acceptance, and use of technology 2 (UTAUT 2) were a part of the regular technology acceptance model (TAM) and unified theory of acceptance and use of technology (UTAUT) models. Further, 11.5% of articles were categorized under the 'general' category that did not belong to any specific theory or model but rather inherited con-

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Table 3. List of journals and conferences with sharing of articles across the years

No.	Sources	2014	2015	2016	2017	2018	2019	2020	Frequency
1	Telematics and Informatics			1		1	2	1	5
2	Technological Forecasting & Social Change				1	3			4
3	Behaviour & information technology						3	1	4
4	Computers & Security		1				1	1	3
5	International Journal of Information Management						1	1	2
6	Kybernetes				1	1			2
7	International Journal of Environmental Research and Public Health						2		2
8	IEEE Internet of Things Journal				1			1	2
9	Technology in Society						1	1	2
10	Computers in Human Behavior			1		1			2
11	IEEE Access					1		1	2
12	Journal of Computer Information Systems			1		1			2
13	Journal of enabling technologies					1			1
14	Informatics						1		1
15	International Journal of Human-Computer Interaction					1			1
16	Cogent Business & Management							1	1
17	Journal of Business & Industrial Marketing					1			1
18	International Journal of Electrical and Computer Engineering			1					1
19	Journal of Sensors					1			1
20	Sustainability						1		1
21	Technologies					1			1
22	Government Information Quarterly					1			1
23	Journal of Enterprise Information management							1	1
24	Journal of King Saud University - Computer and Information Sciences						1		1
25	Journal of Organizational and End User Computing					1			1
26	International Journal of Innovation							1	1
27	Total Quality Management				1				1
28	Library Hi Tech					1			1
29	Journal of Retailing and Consumer Services					1			1
30	Asia Pacific Journal of Marketing and Logistics	1							1

Table 3. Continued

No.	Sources	2014	2015	2016	2017	2018	2019	2020	Frequency
31	Organizacija					1			1
32	Istanbul Gelisim University Journal of Social Sciences						1		1
33	Information Technology & People			1					1
34	Science & Technology				1				1
35	International Journal of Advanced Computer Science and Applications							1	1
36	International Journal of Social Sciences						1		1
37	Engineering, Technology & Applied Science Research						1		1
38	International Review of Management and Business Research					1			1
39	Journal of High Technology Management Research						1		1
40	International Journal of Production Research					1			1
41	Journal of Biomedical Informatics					1			1
42	Industrial Management & Data Systems				1				1
43	Information Technology & Tourism						1		1
44	Journal of Theoretical and Applied Information Technology					1			1
45	International Journal of Recent Technology and Engineering							1	1
46	Tecnología. Glosas de Innovación Aplicadas a la Pyme							1	1
47	International Journal of Sports Marketing and Sponsorship						1		1
48	Future Internet							1	1
49	International Journal of Engineering and Technology Innovation						1		1
50	International Journal of Production Economics	1							1
51	Alexandria Engineering Journal							1	1
52	Economic and Environmental Studies				1				1
53	Journal of Destination Marketing & Management							1	1
54	Asia Pacific Journal of Tourism Research						1		1
55	ITS Kyoto 2017, conference				1				1
56	PACIS 2016, conference			1					1
57	ECIS2018, conference					1			1

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Table 3. Continued

No.	Sources	2014	2015	2016	2017	2018	2019	2020	Frequency
58	SIGITE 2018, conference					1			1
59	ICSEC 2016, conference			1					1
60	TEMSCON 2019, conference						1		1
61	CAST 2017, conference			1					1
62	ICBE 2019, conference						1		1
63	ICC 2017, conference				1				1
64	ICMI 2017, conference				1				1
65	ICIS 2018, conference					1			1
66	ICSECS 2019, conference						1		1
67	KMO 2019, conference						1		1
Total	54 journals and 13 conference papers	2	1	8	10	25	25	16	87

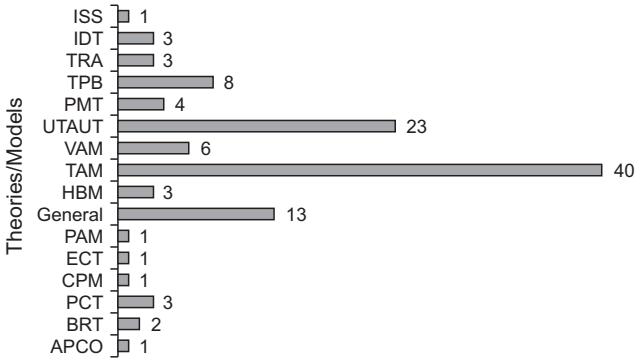

Fig. 5. List of theories/models. ISS: information systems success model, IDT: innovation diffusion theory, TRA: theory of reasoned action, TPB: theory of planned behavior, PMT: protection motivation theory, UTAUT: unified theory of acceptance and use of technology, VAM: value-based adoption model, TAM: technology acceptance model, HBM: health belief model, PAM: post-acceptance model, ECT: expected confirmation theory, CPM: communication privacy management, PCT: privacy calculus theory, BRT: behavioral reasoning theory, APCO: antecedents-privacy concerns-outcomes.

structs from different studies. Notably, some of the papers proposed conceptual models by integrating multiple theories. As a result, the number of the following theories exceeds the number of collected papers. TAM (40 papers) is the most widely used model in the checked articles, whereas the UTAUT (23 papers) and theory of planned behavior (TPB) (8 papers) come next. These top three theories have contributed to 62.83% of the total papers. Further, all these articles were categorized into 23 types of different technologies and services of IoT (see Fig. 6).

Most journals (31.03%) follow general technologies and services, where these technologies and services do not specify any specific applications, rather IoT technology and services in general. Smart homes (17.24%) and health (20.68%), on the other hand, are the most popular specific technologies and services, respectively. However, most of the applications (15 out of 23) have been used only once in these papers. According to our findings, the top five contributing countries are South Korea, Malaysia, China, India, and the USA, which have contributed 42.85% of the total amount of papers.

Moreover, a total of 246 authors contributed to developing 87 IoT-related papers with an average of 2.827 or almost three authors per paper. Only 14 authors contributed more than one paper whereas 232 authors contributed only once. Nonetheless, these 246 authors have utilized 14 different types of samples in their studies (see Fig. 7). A maximum of papers (48.27%) have utilized consumers as the sampling type, followed by students (14.94%). Notably, students, teachers, faculty members, and university staff are considered the same sampling type.

We have identified several theories and models utilized in the IoT domain in Fig. 5. In general, these theories and models were developed based on the combination of dependent-independent variables and their relationships. Examples of dependent variables can be Intention, Behavior, and Attitude, which were also the focus variables of this study, and independent variables performed as the influencing factors of these focus variables. As for expla-

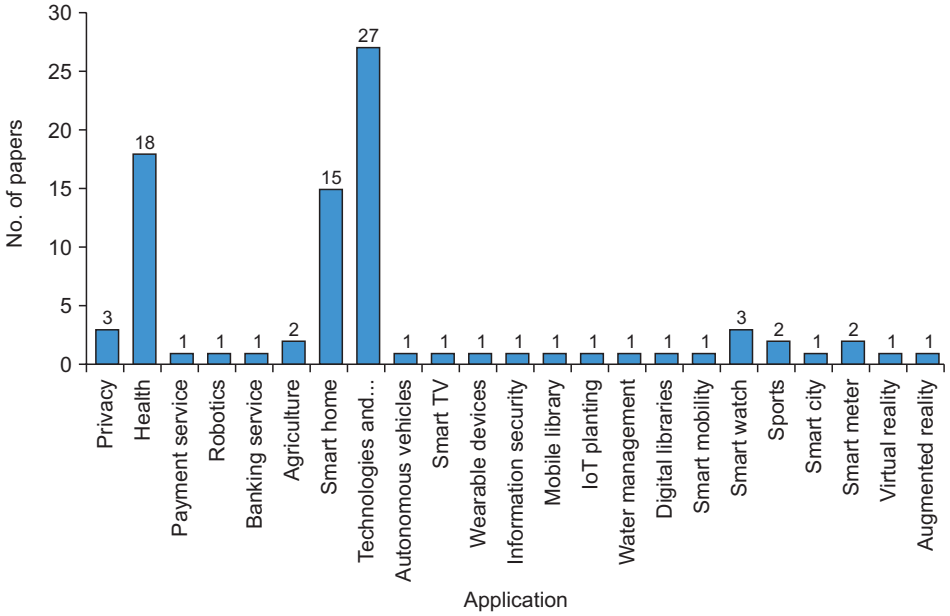

Fig. 6. List of Internet of Things enabled technologies and services.

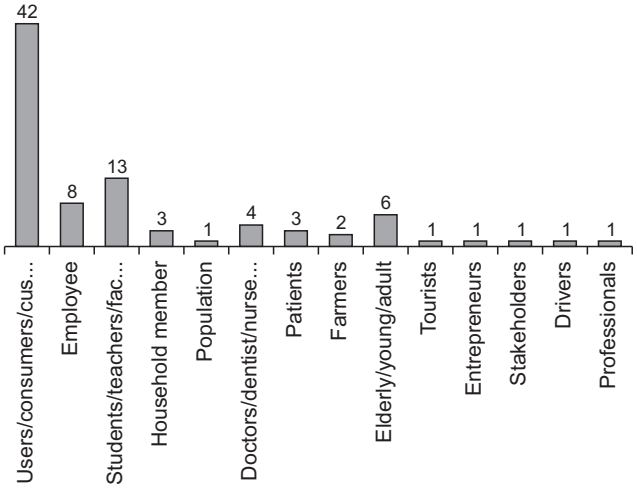

Fig. 7. List of sampling types.

nation, the Trust variable acted as a predictor of Intention in 11 papers where the relationship of Trust-Intention was significant nine times. Therefore, Trust gained the weight value of 0.82 and can be categorized both as WUT and BPR (see Appendix). Importantly, in order to perform the weight analysis, we have to count the frequency of these independent variables first.

Therefore, we have counted the frequency of independent variables which were used in different theories and models in these papers (see Table 4). Our analysis has found 165 exogenous variables in different models and theories of IoT papers. Based on the occurrences, the top five variables are Perceived usefulness (48 times), Perceived ease of use (38 times), Attitude (33 times), Social influence (24 times), and Performance expectancy (18 times), which are part of TAM and UTAUT. Apart from the established models, Trust (17 times), Risk (16 times), and Privacy (16 times) are highly used.

Further, we have evaluated the weight of each predictor variable. We have three dependent variables: Attitude, Intention, and Behavior. The anticipation or present observations of behavioral advantages and negatives are referred to as Attitudes (Rodríguez-Calvillo et al., 2011). In contrast, the degree to which an individual has formed a conscious strategy to undertake or not perform certain prospective actions is defined as Intention. Finally, the user's self-reported frequency and amount of technology use are characterized as Behavior (Amelia & Ronald, 2017). Notably, Attitude determines Intention, and Intention predicts Actual usage or Behavior, according to the TRA, TAM, and TPB models (Olushola & Abiola, 2017). Furthermore, according to Rayat (2018), a diagrammatically represented figure is meant to provide a graphical demonstration of quantitative facts to develop the concept more comprehensively. In addition, this diagram can also be utilized to evaluate the weight of variables to finalize their overall outcome (Rana et al., 2015). As a result, following Rana et al. (2015), all the significant and non-significant associations are diagrammatically displayed in Figs. 8, 9, and 10, along with their weight values and type of relations (either negative or positive). It is worth mentioning that the weight values of each variable directed towards Intention, Behavior, and Attitude are included in

Table 4. List of variables with frequency

No.	Variable	Short form	Count	No.	Variable	Short form	Count
1	Perceived usefulness	PU	48	84	Perceived expectancy	PEXP	1
2	Perceived ease of use	PEOU	38	85	Product-related factors	PRF	1
3	Attitude	ATT	33	86	Social inf-related factor	SIF	1
4	Social influence	SI	24	87	Security-related factors	SECF	1
5	Performance expectancy	PE	18	88	Functionality & reliabil.	FAR	1
6	Trust	TRU	17	89	Helpfulness	HELP	1
7	Risk	RIS	16	90	Social network	SOCN	1
8	Privacy	PRI	16	91	Community interest	CINT	1
9	Facilitating condition	FC	16	92	Tech. min. ind.	TMI	1
10	Enjoyment	ENJOY	14	93	Perceived safety	PSAFE	1
11	Effort expectancy	EE	14	94	Efficiencies	EFFIC	1
12	Subjective norm (social norm)	SN	13	95	Per. pers and soci. ben.	PASB	1
13	Cost (response)	COST	12	96	Network quality	NETQ	1
14	Self-efficacy	SE	10	97	Lack of sub-services	LSS	1
15	Innovativeness	INNOV	9	98	Alternatives	ALTER	1
16	Perceived behavioral control	PBC	9	99	Empowerment	EMPOW	1
17	Compatibility	COMP	8	100	Social support	SSUP	1
18	Perceived value	PVAL	8	101	Perceived susceptibility	PSUS	1
19	Perceived Security	PSEC	7	102	Information carrier char	ICC	1
20	Habits	HAB	7	103	Observability	OBSRV	1
21	Convenience	CONV	6	104	Reference group infl.	RGI	1
22	Satisfaction	SATF	6	105	Health belief	HB	1
23	Awareness	AWARE	6	106	Image	IMG	1
24	Perceived benefits	PBEN	5	107	Perceived sacrifice	PSAC	1
25	Knowledge	KNO	5	108	Innovation resistance	INNOVR	1
26	Perceived severity	PS	5	109	Recommendation	RECOM	1
27	Perceived connectedness	CONTD	5	110	Socialising	SOC	1
28	Price value	PRVAL	5	111	Threat appraisal	TA	1
29	Service quality	SERVQ	4	112	Experience & involve.	EXPNINV	1
30	Perceived vulnerability	PV	4	113	Organizational policies	ORGP	1
31	Perceived Fee	PFEE	4	114	Inf. Environ. quality	INFOENQ	1
32	Perceived technicality	PTECH	4	115	People initiative	PEOI	1
33	Hedonic motivation	HEDM	4	116	Participation	PARTIC	1
34	Openness	OPEN	3	117	Training	TRAIN	1

Table 4. Continued

No.	Variable	Short form	Count	No.	Variable	Short form	Count
35	Collectivism	COL	3	118	System quality	SYSQ	1
36	Perceived controllability	PCTRL	3	119	Affinity	AFFIN	1
37	Information quality	INFOQ	3	120	Technology readiness	TREADY	1
38	Advantage	ADV	2	121	Superior functionality	SFUNC	1
39	Availability	AVAIL	2	122	Perceived adaptiveness	PADAPT	1
40	Power distance	PD	2	123	Store reputation	SREPUT	1
41	Masculinity	MASC	2	124	IoT skills	ISKILL	1
42	Uncertainty Avoidance	UA	2	125	Mobile skill	MSKILL	1
43	Agreeableness	AGREE	2	126	Social skill	SSKILL	1
44	Extraversion	EXTRA	2	127	Creative skill	CSKILL	1
45	Conscientiousness	CONS	2	128	Inf. navigation skill	NSKILL	1
46	Neuroticism	NEURO	2	129	Health concerns	HC	1
47	Improper access	IACC	2	130	Perceived confidence	CONFID	1
48	Perceived Utility	PUTI	2	131	Perceived intelligence	INTLG	1
49	Perceived Usability	PUSE	2	132	Cognitive experience	CEXP	1
50	Perceived barriers	PBAR	2	133	Affect experience	AEXP	1
51	Trialability	TRIAL	2	134	Ext organization var.	EOV	1
52	Information Accuracy	IACC	2	135	Int. organization var.	IOV	1
53	Response efficacy	RE	2	136	Digital dexterity	DDEX	1
54	Privacy and security	PRINSEC	2	137	National cultures	NCUL	1
55	Word of Mouth	WOM	2	138	Per. self-expressiveness	EXPR	1
56	Intrusiveness	INTRUS	2	139	Vanity	VAN	1
57	Mobility	MOB	2	140	Uniqueness	UNIQ	1
58	Credibility	CREDI	2	141	Affective quality	AFFEQ	1
59	Automation	AUTOM	2	142	Autonomy	AUTO	1
60	Scope of sharing	SOS	1	143	Affordability	AFFORD	1
61	Visualization	VIS	1	144	Self-capability	SCAP	1
62	Reason for	RSNF	1	145	Experience	EXP	1
63	Reason against	RSNA	1	146	Past behavior	PBV	1
64	Ubiquitous	UBIQ	1	147	Interoperability	IOPR	1
65	Usage barrier	UBAR	1	148	Hedonic innovativeness	HINNOV	1
66	Traditional barrier	TBAR	1	149	Cognitive innovative	CINNOV	1
67	Tracking	TRAC	1	150	Functional innovative	FINNOV	1
68	Rescue value	RVAL	1	151	Social innovativeness	SINNOV	1

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Table 4. Continued

No.	Variable	Short form	Count	No.	Variable	Short form	Count
69	Service Security	SSEC	1	152	Perceived gamification	PGAM	1
70	Platform Security	PLSEC	1	153	Hindering condition	HINDC	1
71	Network Security	NSEC	1	154	Individual factors	INDF	1
72	Device Security	DSEC	1	155	Health	HLTH	1
73	Confirmation	CONFM	1	156	Sustainability	SUST	1
74	Anthropomorphism	ANTHRO	1	157	Trust in technology	TRUT	1
75	Technophobia	TECHB	1	158	Trust in Government	TRUG	1
76	Personalization	PERSON	1	159	Eco-Effective Feedback	EEF	1
77	Long-term orientation	LTO	1	160	Perceived immersion	PIMM	1
78	Facilitated appropriation	FACA	1	161	Perceived complexity	PCOMX	1
79	Perceived reliability	PREL	1	162	Sensation-seeking	SSEEK	1
80	Errors	ERRR	1	163	Per. captivating inputs	PCAPI	1
81	Secondary Use	SUSE	1	164	Tech and legal concern	TLC	1
82	Ethics	ETHIC	1	165	Consistency	CONSS	1
83	Network Externality	PEXT	1				

the Appendix in the form of tables, where the calculation procedure has been previously described in Section 2.3. In addition, the above-mentioned figures (Figs. 8-10) have extracted the outcomes of these tables accordingly.

A total of 94 variables are observed to have direct relationships with Intention where 12, 18, 49, and 76 of them are BPR, WUT, PROM, and EXPR, respectively (see Fig. 8). The top seven occurred variables are Attitude (37 times), Perceived usefulness (34 times), Social influence (20 times), Perceived ease of use (18 times), Performance expectancy (15 times), Effort expectancy (15 times), and Subjective norm (14 times). On the other hand, a total of 26 variables have direct relationships with Behavior where 1, 1, 17, and 25 of them are BPR, WUT, PROM, and EXPR, respectively (see Fig. 9). The maximum occurred variable is Intention (13 times), followed by Trust (2 times) and Risk (2 times), and the remaining variables exist only once.

At last, a total of 33 variables are observed to have direct relationships with an Attitude where 2, 3, 23, and 30 of them are BPR, WUT, PROM, and EXPR, respectively (see Fig. 10). The maximum occurred variables are Perceived ease of use (23 times), Perceived usefulness (23 times) which followed Risk (5 times), Trust (3 times), Privacy (3 times), Performance expectancy (3 times), and Effort expectancy (3 times). Moreover, 22 out of 33 variables occur only once.

Jeyaraj et al. (2006) advised researchers to continue employing the best predictors within their conceptual models for consumer adoption-related studies. Following the recommendations of Jeyaraj et al. (2006), a conceptual consumer adoption model has been proposed supported by the outcomes of the above three figures. According to our findings, the 12 best predictors of Intention are Perceived ease of use (0.83), Perceived usefulness (0.85), Trust (0.82), Satisfaction (1.00), Habits (1.00), Perceived value (0.88), Subjective norm (1.00), Enjoyment (0.83), Facilitating condition (1.00), Performance expectancy (1.00), Self-efficacy (0.8), and Attitude (0.92). On the other hand, Attitude has the two best predictors—Perceived ease of use (0.83) and Perceived usefulness (0.96); and Behavior has only Intention (1.00) as the best predictor. Interestingly, all of these best predictors are positively associated with the respective focus variables. To measure IoT adoption, we focused primarily on Intention and Behavior, with Attitude acting as a mediator between Perceived ease of use (0.83), Perceived usefulness (0.96), and Intention. More simply, we can say that these 12 best predictors have

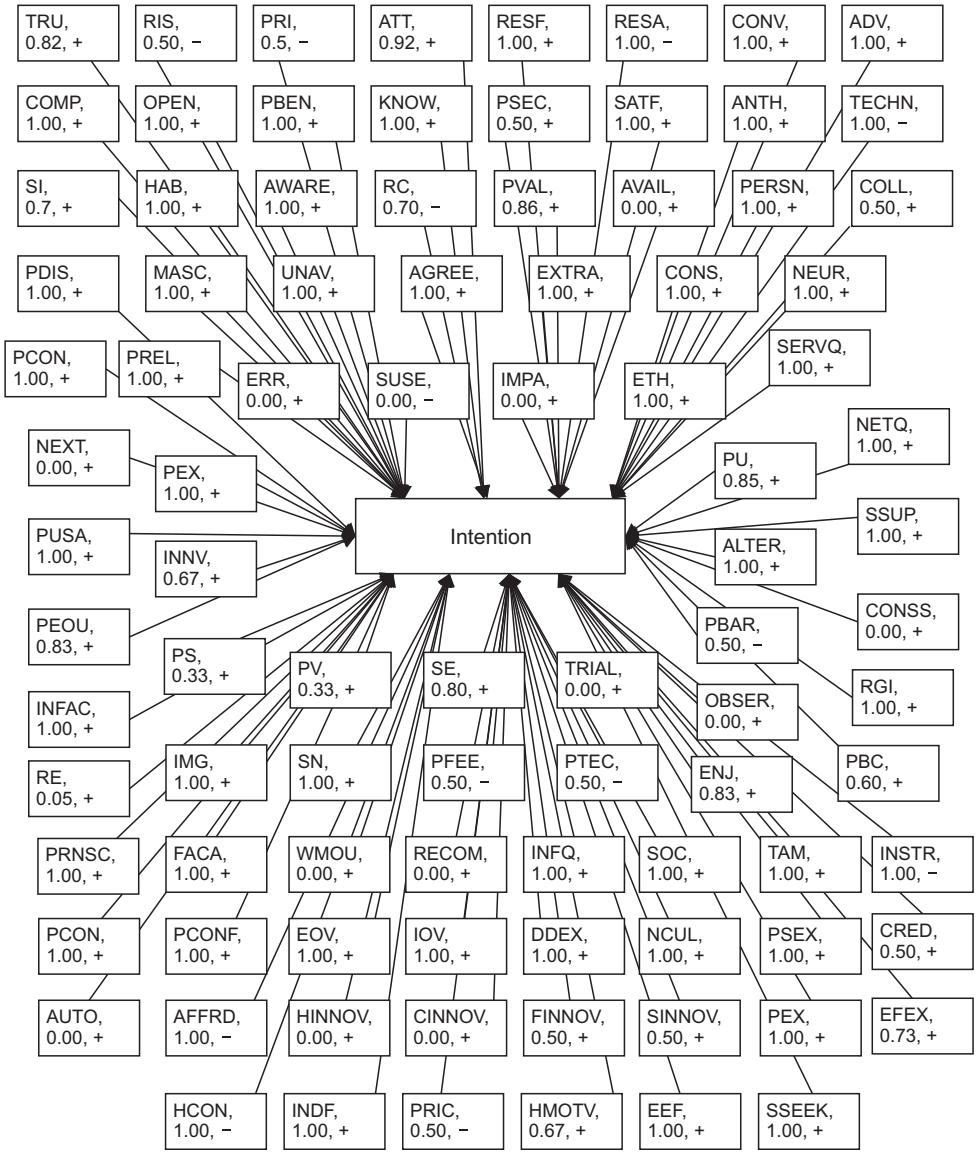

Fig. 8. All associations are diagrammatically represented toward Intention.

achieved the top weighting values, and these are the most influential factors that determine the adoption of IoT among the consumer at the individual level. Thus, the following consumer adoption model can be developed (see Fig. 11).

As we discovered in our study, the correlations between independent and dependent factors are not always significant, and independent variables have sometimes failed to become an efficient predictor of dependent variables. The developed model, on the other hand, is made up of the 12 best predictors that have attained the highest weighting values. As a result, in terms of predictive or explanatory capacity, the suggested conceptual model outperforms any other evaluated theories and models in this literature study. On the flip side, since the model is generic, it may be used in a wide range of IoT areas and can aid in the development of novel and successful social applications. Furthermore, the suggested model is anticipated to serve as guidance for future studies into the aspects that drive individual IoT adoption. Importantly, factor weight patterns may be used as a guide for the subsequent variables and can be further studied to demonstrate their efficacy.

5. DISCUSSION

To comprehend the recent progression of individual consumers' IoT adoption and the overall efficiency of the constructs, this review study performed a weight analy-

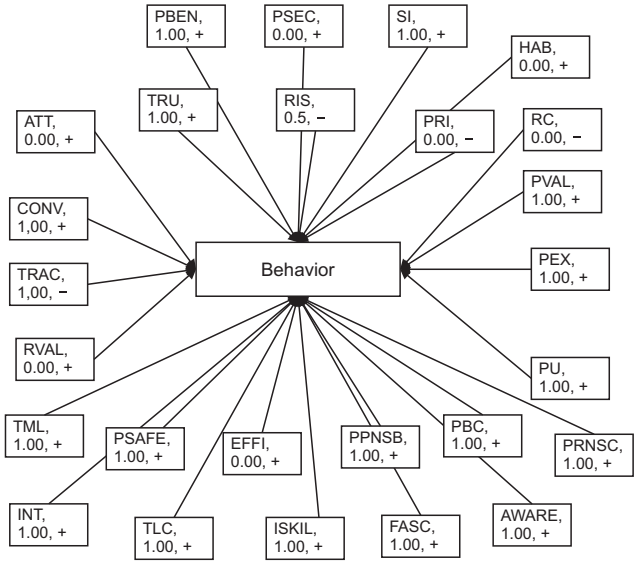

Fig. 9. All associations are diagrammatically represented toward Behavior.

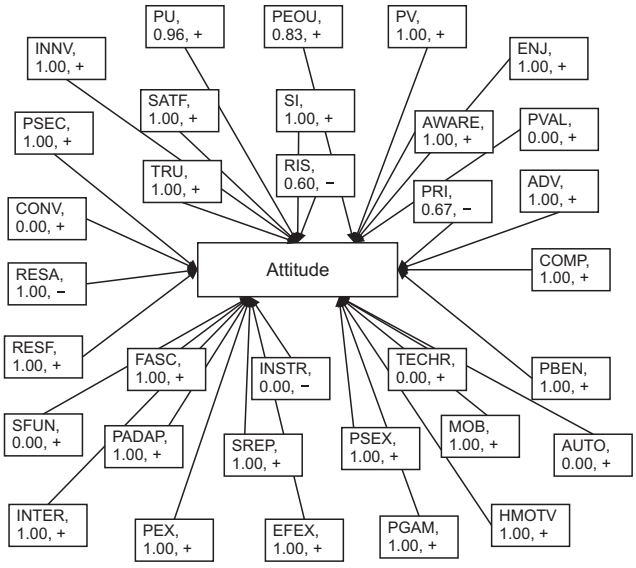

Fig. 10. All associations are diagrammatically represented toward Attitude.

sis of the variables from 87 articles in academic journals and conference proceedings published during the period 2014-2020. This research was carried out with three goals in mind. To be specific, the first goal of this paper was to investigate the growth of individual IoT acceptance in recent years. Therefore, the following significant points emerged from the findings:

- In light of the current hype around IoT, it can be predicted that the number of articles in future years will have an upward trend even with a higher rate.
- 74 journals are distributed in 54 journals with an average rate of 1.37 and each conference has one paper. However, the average rate is not convincing.
- 15 different established theories and models were attempted where priority was given to TAM, UTAUT, and TPB. However, there is still room for some more consumer adoption models and more contribution is expected from the remaining 12 models.
- A study on 23 different areas has been attempted, which is satisfying. However, if we ignore the three areas, i.e., health, smart home, and overall technologies & services, many more contributions are expected from the remaining 20 technologies and services.
- Only 14 different types of samples were attempted, in which the authors mostly targeted consumers and students.

The second objective of this study was to find the most influencing factors of the Intention and Actual usage of IoT applications using weight analysis. This objective was fulfilled through the following steps. The first step was to find the frequency of all variables used in the theories and models to determine Adoption Intention and Actual usage. The second step was to conduct a weight analysis of the variables associated with Attitude, Intention, and Behavior. Notably, we have included Attitude for weight analysis since this variable has been used as a mediator of Intention and Behavior in many papers. According to the findings, among the 165 variables from 87 articles, only 28 variables occurred more than five times, 59 variables occurred more than once, and the remaining 106 variables were attempted only once. Thus, it can be understood that most of the variables were not attempted sufficient times. Afterward, we analyzed 94 direct relationships with Intention, 26 with Behavior, and 33 with Attitude. Following that, 2, 12, and 1 best predictors were found for Attitude, Intention, and Behavior, respectively from our weight analysis. On the other hand, the numbers of promising predictors were 23, 49, and 17 for Attitude, Intention, and Behavior, respectively.

The third objective was to develop an IoT adoption model using the best predictors achieved from weight analysis. We counted the frequency and weight in all research papers on the associations between exogenous and endogenous variables. Afterward, we have found the 12 best predictors from the weight analysis and a model is developed accordingly. These best predictors are Per-

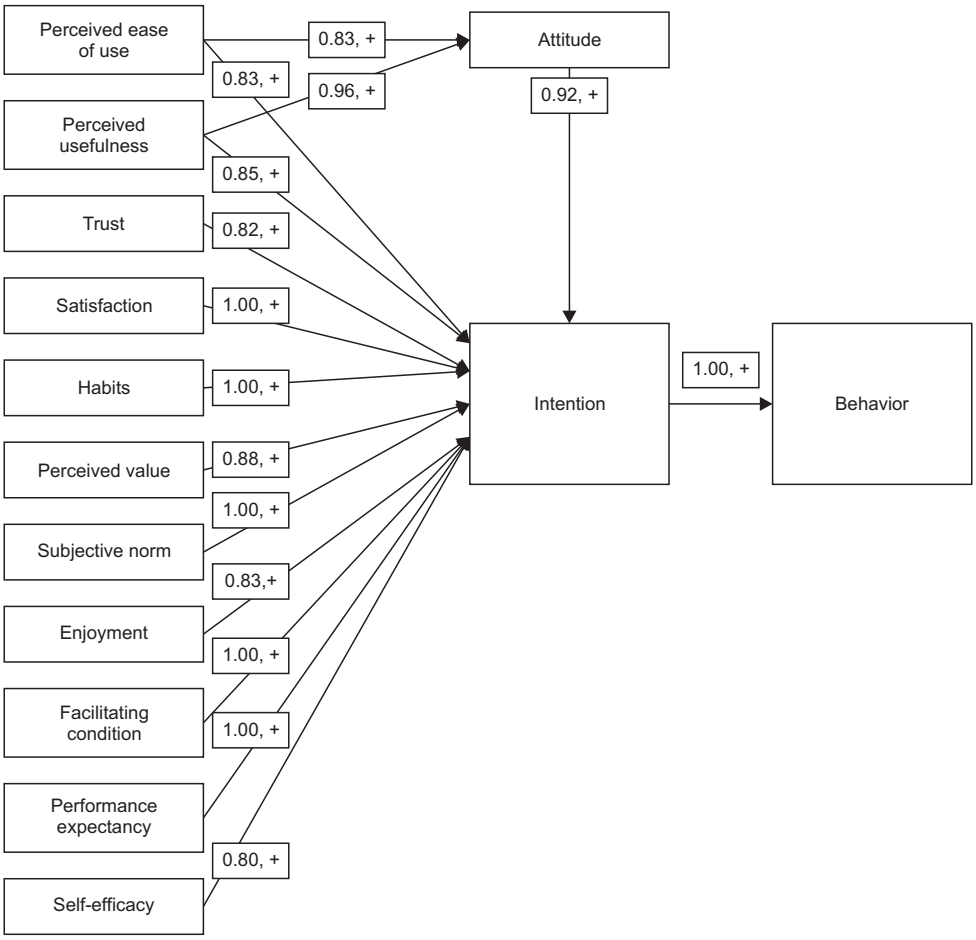

Fig. 11. Internet of Things adoption model using the best predictors from weight analysis.

ceived ease of use (0.83), Perceived usefulness (0.85), Trust (0.82), Satisfaction (1.00), Habits (1.00), Perceived value (0.88), Subjective norm (1.00), Enjoyment (0.83), Facilitating condition (1.00), Performance expectancy (1.00), Self-efficacy (0.8), and Attitude (0.92), which is found to be significant sufficient times in the literature. Besides this, Attitude performs as a mediator between Perceived ease of use (0.83), Perceived usefulness (0.96), and Intention. Further, we have found several promising predictors that can affect Attitude (30 promising predictors), Adoption intention (49 promising predictors), and Behavior (17 promising predictors) of IoT applications. These promising variables have the potential to become the best predictors. However, these variables have not yet been sufficiently attempted. Indeed, Jeyaraj et al. (2006) recommended studying promising predictors inside the conceptual models for individual consumer adoption-related studies.

6. CONCLUSION

This study shows the exponential rise in the number of papers published in the last seven years, which demonstrates IoT as an emerging field with tremendous potential for future years' publications. Though consumer IoT adoption is emerging day by day, it is still in its infant stage because several issues in 20 different technologies and services are still unaddressed and people from different sectors and professionals are not equally involved. Most importantly, if the current growth rate continues, much more progress is expected in the near future. On the other hand, the developed generic IoT model can most effectively predict user IoT adoption. Furthermore, this model can be applicable to a wide range of domains and can help us develop innovative, effective social applications.

Significantly, this is one of the first SLR studies that utilize weight analysis to determine influencing factors for IoT-enabled applications. Moreover, this study's theoretical success is also based on portraying the combined dia-

grammatic representation for individual IoT adoption and calculating the number of significant and non-significant correlations between the leading constructs, which are then used to assess the weight analysis. Afterward, a new IoT adoption model has been developed in our study which is generic and capable of addressing all the analyzed IoT technologies and services. In addition, this developed model is capable of enhancing theoretical knowledge of individual IoT adoption and is able to develop a solid foundation for information management literature. From a practical standpoint, consumers, communities, and businesses might all profit from this developed IoT paradigm. Additionally, similar to our findings, Lee and Lee (2015) confirm that the potential of IoT devices is enormous; however, the future uncertainty of investment remains a concern for decision-makers. Therefore, the current growth of IoT among individuals in recent years and derived influencing factors (best predictors and promising predictors) are expected to influence and assist organizations, policymakers, and entrepreneurs in the further development of their business plans. Further, the results of this study have meaningful implications for companies that provide IoT-based services and/or decide to launch new services.

This study has a few drawbacks which can be addressed in future studies. To begin, papers were collected only from five databases, as stated earlier. Hence, some other databases such as EBSCO, ProQuest, PubMed, ACM, JSTOR, Wiley, or Hindawi were overlooked. Afterward, the searching keyword used for this weight analysis might be inadequate. We could have used more keywords related to specific IoT applications such as "smart home adoption/acceptance," health service adoption/acceptance," etc. As a result, we may have overlooked some articles and facts. Moreover, we performed a weight analysis on the generic issues of IoT adoption, whereas specific issues might lead to some other interesting results. On the other hand, some more statistical procedures can be followed to measure the relationships between the variables, for example, standard normal deviation, average β values, and lower & upper 95% confidence intervals (Baptista & Oliveira, 2016). Last, we have addressed individual consumer IoT adoption in this paper, and organizational IoT adoption might also be an interesting topic. Afterward, it would also be possible to make a comparison between these two types of IoT adoptions which will lead to some remarkable results.

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APPENDIX.

Weight calculation where the endogenous variable is Intention

No.	Exogenous variable	Sig	Non-sig	Total	Weight	Predictor efficiency
1	Trust	9	2	11	0.82	WUT, BPR
2	Risk	3	3	6	0.50	WUT
3	Privacy	2	2	4	0.50	EXPR
4	Attitude	34	3	37	0.92	WUT, BPR
5	Reason for	1		1	1.0	EXPR, PROM
6	Reason against	1		1	1.0	EXPR, PROM
7	Convenience/comfort	1		1	1.0	EXPR, PROM
8	Advantage	1		1	1.0	EXPR, PROM
9	Compatibility	4		4	1.0	EXPR, PROM
10	Openness	1		1	1.0	EXPR, PROM
11	Perceived benefits	2		2	1.0	EXPR, PROM
12	Knowledge	4		4	1.0	EXPR, PROM
13	Perceived Security	1	1	2	0.50	EXPR
14	Satisfaction	5		5	1.0	WUT, BPR
15	Anthropomorphism	1		1	1.0	EXPR, PROM
16	Technophobia	1		1	1.0	EXPR, PROM
17	Social influence	14	6	20	0.70	WUT
18	Habits	6		6	1.0	WUT, BPR
19	Awareness	3		3	1.0	EXPR, PROM
20	Cost (response)	7	3	10	0.70	WUT
21	Perceived value	7	1	8	0.88	WUT, BPR
22	Availability		1	1	0.0	EXPR
23	Personalization	1		1	1.0	EXPR, PROM
24	Collectivism	1	1	2	0.5	EXPR
25	Power Distance	1		1	1.0	EXPR, PROM
26	Masculinity	1		1	1.0	EXPR, PROM
27	Uncertainty Avoidance	1		1	1.0	EXPR, PROM
28	Agreeableness	1		1	1.0	EXPR, PROM
29	Extraversion	1		1	1.0	EXPR, PROM
30	Conscientiousness	1		1	1.0	EXPR, PROM
31	Neuroticism	1		1	1.0	EXPR, PROM
32	Perceived controllability	1		1	1.0	EXPR, PROM
33	Perceived reliability	1		1	1.0	EXPR, PROM

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No.	Exogenous variable	Sig	Non-sig	Total	Weight	Predictor efficiency
34	Errors		1	1	0.0	EXPR
35	Secondary Use		1	1	0.0	EXPR
36	Improper access		1	1	0.0	EXPR
37	Ethics	1		1	1.0	EXPR, PROM
38	Service quality	1		1	1.0	EXPR, PROM
39	Perceived Utility	2		2	1.0	EXPR, PROM
40	Network Externality		1	1	0.0	EXPR
41	Perceived Expectancy	1		1	1.0	EXPR, PROM
42	Perceived Usability	2		2	1.0	EXPR, PROM
43	Innovativeness	4	2	6	0.67	WUT
44	Perceived ease of use	15	3	18	0.83	WUT, BPR
45	Perceived usefulness	29	5	34	0.85	WUT, BPR
46	Network quality	1		1	1.0	EXPR, PROM
47	Alternatives	1		1	1.0	EXPR, PROM
48	Social Support	1		1	1.0	EXPR, PROM
49	Perceived barriers	1	1	2	0.5	EXPR
50	Consistency		1	1	0.0	EXPR
51	Perceived severity	1	2	3	0.33	EXPR
52	Perceived vulnerability	1	2	3	0.33	EXPR
53	Self-efficacy	4	1	5	0.80	WUT, BPR
54	Trialability		2	2	0.0	EXPR
55	Observability		1	1	0.0	EXPR
56	Reference Group Influence	1		1	1.0	EXPR, PROM
57	Information Accuracy	1		1	1.0	EXPR, PROM
58	Response efficacy	1	1	2	0.5	EXPR
59	Image	1		1	1.0	EXPR, PROM
60	Subjective norm (social norm)	14		14	1.0	WUT, BPR
61	Perceived Fee	1	1	2	0.5	EXPR
62	Perceived Technicality	1	1	2	0.5	EXPR
63	Enjoyment	5	1	6	0.83	WUT, BPR
64	Perceived Behavioral Control	6	4	10	0.60	WUT
65	Privacy and security	1		1	1.0	EXPR, PROM
66	Facilitating condition	11		11	1.0	WUT, BPR
67	Word of Mouth		1	1	0.0	EXPR
68	Recommendation		1	1	0.0	EXPR

Continued

No.	Exogenous variable	Sig	Non-sig	Total	Weight	Predictor efficiency
69	Information quality	2		2	1.0	EXPR, PROM
70	Socializing	1		1	1.0	EXPR, PROM
71	Threat appraisal	1		1	1.0	EXPR, PROM
72	Intrusiveness	1		1	1.0	EXPR, PROM
73	Perceived connectedness (connectivity)	1		1	1.0	EXPR, PROM
74	Perceived Confidence	1		1	1.0	EXPR, PROM
75	External Organisation Variables	1		1	1.0	EXPR, PROM
76	Internal Organization Variables	1		1	1.0	EXPR, PROM
77	Digital Dexterity	1		1	1.0	EXPR, PROM
78	National Cultures	1		1	1.0	EXPR, PROM
79	Perceived self-expressiveness	1		1	1.0	EXPR, PROM
80	Credibility	1	1	2	0.5	EXPR
81	Automation		1	1	0.0	EXPR
82	Affordability	1		1	1.0	EXPR, PROM
83	Hedonic innovativeness		2	2	0.0	EXPR
84	Cognitive innovativeness		2	2	0.0	EXPR
85	Functional innovativeness	1	1	2	0.5	EXPR
86	Social innovativeness	1	1	2	0.5	EXPR
87	Performance expectancy	15		15	1.0	WUT, BPR
88	Effort expectancy	11	4	15	0.73	WUT
89	Hindering condition	1		1	1.0	EXPR, PROM
90	Individual factors	1		1	1.0	EXPR, PROM
91	Price value	2	2	4	0.5	EXPR
92	Hedonic motivation	2	1	3	0.67	EXPR
93	Eco-Effective Feedback	1		1	1.0	EXPR, PROM
94	Sensation-seeking	1		1	1.0	EXPR, PROM

WUT: well-utilized, BPR: best-predictors, EXPR: experimental, PROM: promising predictors.

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Weight calculation where the endogenous variable is Behavior

No.	Exogenous variable	Sig	Non-sig	Total	Weight	Predictor efficiency
1	Trust	2		2	1.0	EXPR, PROM
2	Risk	1	1	2	0.5	EXPR
3	Privacy		1	1	0.0	EXPR
4	Attitude		1	1	0.0	EXPR
5	Convenience/comfort	1		1	1.0	EXPR, PROM
6	Tracking	1		1	1.0	EXPR, PROM
7	Rescue value		1	1	0.0	EXPR
8	Perceived benefits	1		1	1.0	EXPR, PROM
9	Perceived Security		1	1	0.0	EXPR
10	Social influence	1		1	1.0	EXPR, PROM
11	Habits		1	1	0.0	EXPR
12	Awareness	1		1	1.0	EXPR, PROM
13	Cost (response)		1	1	0.0	EXPR
14	Perceived value	1		1	1.0	EXPR, PROM
15	Perceived Expectancy	1		1	1.0	EXPR, PROM
16	Perceived usefulness	1		1	1.0	EXPR, PROM
17	Technologically minded individuals	1		1	1.0	EXPR, PROM
18	Perceived safety	1		1	1.0	EXPR, PROM
19	Efficiencies		1	1	0.0	EXPR
20	Perceived personal and societal benefits	1		1	1.0	EXPR, PROM
21	Perceived Behavioral Control	1		1	1.0	EXPR, PROM
22	Privacy and security	1		1	1.0	EXPR, PROM
23	Facilitating condition	2		2	1.0	EXPR, PROM
24	IoT skills	1		1	1.0	EXPR, PROM
25	The technological and legal concern	1		1	1.0	EXPR, PROM
26	Intention	13		13	1.0	WUT, BPR

WUT: well-utilized, BPR: best-predictors, EXPR: experimental, PROM: promising predictors.

Weigh calculation where the endogenous variable is Attitude

No.	Exogenous variable	Sig	Non-sig	Total	Weight	Predictor efficiency
1	Trust	3		3	1.0	EXPR, PROM
2	Risk	3	2	5	0.60	WUT
3	Privacy	2	1	3	0.67	EXPR
4	Reason for	1		1	1.0	EXPR, PROM
5	Reason against	1		1	1.0	EXPR, PROM
6	Convenience/comfort		1	1	0.0	EXPR
7	Advantage	1		1	1.0	EXPR, PROM
8	Compatibility	2		2	1.0	EXPR, PROM
9	Perceived benefits	1		1	1.0	EXPR, PROM
10	Perceived Security	2		2	1.0	EXPR, PROM
11	Satisfaction	1		1	1.0	EXPR, PROM
12	Social influence	2		2	1.0	EXPR, PROM
13	Awareness	2		2	1.0	EXPR, PROM
14	Perceived value		1	1	0.0	EXPR
15	Innovativeness	1		1	1.0	EXPR, PROM
16	Perceived ease of use	19	4	23	0.83	WUT, BPR
17	Perceived usefulness	22	1	23	0.96	WUT, BPR
18	Perceived vulnerability	1		1	1.0	EXPR, PROM
19	Enjoyment	3		3	1.0	EXPR, PROM
20	Facilitating condition	1		1	1.0	EXPR, PROM
21	Intrusiveness		1	1	0.0	EXPR
22	Technology Readiness		1	1	0.0	EXPR
23	Superior Functionality		1	1	0.0	EXPR
24	Perceived Adaptiveness	1		1	1.0	EXPR, PROM
25	Store Reputation	1		1	1.0	EXPR, PROM
26	Perceived self-expressiveness	1		1	1.0	EXPR, PROM
27	Mobility	1		1	1.0	EXPR, PROM
28	Automation		1	1	0.0	EXPR
29	Interoperability	1		1	1.0	EXPR, PROM
30	Performance expectancy	3		3	1.0	EXPR, PROM
31	Effort expectancy	3		3	1.0	EXPR, PROM
32	Perceived gamification	1		1	1.0	EXPR, PROM
33	Hedonic motivation	1		1	1.0	EXPR, PROM

WUT: well-utilized, BPR: best-predictors, EXPR: experimental, PROM: promising predictors.

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JISTaP http://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 10(2): 74-85, 2022

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2022.10.2.5

Assessing Publication Productivity of the Top 10 Countries Across Medical Specialties: Prolific Versus Prestigious Journals

Eungi Kim
Department of Library and Information Science, Keimyung University, Daegu, Korea
E-mail: egkim@kmu.ac.kr

Yong-Gu Lee*
Department of Library and Information Science, Kyungpook National University, Daegu, Korea
E-mail: yglee@knu.ac.kr

ABSTRACT

This study aimed to investigate publication productivity in various medical specialties in the top 10 countries with the highest number of published journal articles, considering the distinction between prolific and prestigious journals. For this study, we selected 10 specialties from the Scientific Journal Rankings (SJR) and used journals listed in both SJR and PubMed. Bibliographic details of these journals' articles published from 2017 to 2019 were downloaded from PubMed. The results showed that various aspects of medical publication output were influenced by country characteristics such as specialty, journal type, population size, wealth, and healthcare expenditure. China showed the greatest variability in terms of specialty, as its publications in Oncology (ONCGY) were exceptionally high compared with the specialties of other countries. China's publications in ONCGY exceeded even those of the United States in ONCGY. Furthermore, the western countries, the United Kingdom, Canada, and the United States in particular published more articles in prestigious journals than the other top 10 countries, where the East Asian countries published more articles in prolific journals than in prestigious journals.

Keywords: prolific journals, prestigious journals, h-index, medical specialties, journal types, PubMed

Received: April 3, 2022 **Revised:** May 12, 2022
Accepted: May 19, 2022 **Published:** June 30, 2022

***Corresponding Author:** Yong-Gu Lee
https://orcid.org/0000-0002-0192-8711
E-mail: yglee@knu.ac.kr

1. INTRODUCTION

In the past two decades, there has been an enormous growth of research publications in large bibliographic databases such as PubMed (https://pubmed.ncbi.nlm.nih.gov). PubMed, provided by the National Institutes of Health (NIH), is considered a leading source of medical research publications (Williamson & Minter, 2019). In the past, numerous bibliometric studies have been conducted based on PubMed to assess the medical research outputs of certain countries and regions (Albarqouni et al., 2018; Song et al., 2014; Tadmouri et al., 2019; Tan & Sijbrands, 2020). The quantitative results of such studies may vary among medical specialties, as these are important divisions of medical research. Medical specialties will be referred to simply as "specialties" hereinafter.

Modern specialties emerged in the early nineteenth century as a form of knowledge production closely related to clinical practice (Weisz, 2003). Today, the number of specialties has increased as medical practices have become more complex (Dolan, 2021). The American Board of Medical Specialties (https://www.abms.org), a professional organization that certifies specialties in the United States, has certified more than 150 specialties to date. Many previous studies have focused on identifying characteristics of each specialty (Jamjoom & Jamjoom, 2016; Özen Çınar, 2020; Shamseddine et al., 2014).

Consequently, publication patterns within the specialties of particular countries need to be assessed more comprehensively, as superficial analyses can mislead researchers. Various factors, such as population size, wealth, and health care expenditure, must be taken into consideration when assessing countries' publication outputs. It is also useful to consider different types of journals because scientific journals are often considered as the basic unit for evaluating publication output (Schubert & Braun, 1986). First, we considered prolific journals, i.e., journals that publish a large number of articles in specific fields. Prolific journals are common in various fields of study (Konur, 2012; Zhao et al., 2018). We also considered prestigious journals, i.e., journals that have relatively high h-indexes in certain fields. A journal's h-index is considered a reasonable indicator of a journal's impact and prestige (Bornmann et al., 2009) and is a single numerical indicator that takes into account both the number of citations and the number of published documents (Braun et al., 2006).

In recent years, there has been considerable interest in examining the scientific productivity of leading countries (Elango & Oh, 2022). In light of this, it is possible to compare the research output of leading countries using the bibliographic data of journals with high h-indexes. However, there is a lack of studies that have examined specialties within specific countries using different journal types. Considering the distinction between prolific and prestigious journals, the publication patterns of specialties in the leading countries should be examined in terms of journal types in addition to various country characteristics, such as population size and the country's wealth and health expenditure.

The 10 countries that published the highest number of articles in medicine were the following: the United States, China, Japan, the United Kingdom, Germany, Italy, Canada, France, Australia, and South Korea. Moreover, the 10 specialties selected for this study were the following: Cardiology and Cardiovascular Medicine (CARGY); Infectious Diseases (INFEC); Neurology (NEURO); Oncology (ONCGY); Orthopedics and Sports Medicine (ORTHO); Pediatrics, Perinatology, and Child Health (PEDIA); Pharmacology (PHARM); Psychiatry and Mental Health (PSYCH); Radiology, Nuclear Medicine, and Imaging (RADGY); and Surgery (SURGY). These specialties had the highest numbers of journals indexed in the Scientific Journal Ranking (SJR).

Hence, the objective of this study was twofold:

a) to examine publication productivity in various medical specialties in the top 10 countries with the highest number of published journal articles
b) to compare the output of the specialties in the top 10 countries in terms of prestigious and prolific journals

2. METHODOLOGY

In this study, we examined the publication productivity of the previously mentioned 10 specialties and 10 countries. Publication productivity is commonly used to measure the performance of researchers, institutions, disciplines, and countries (Aboagye et al., 2021; Koljatic & Silva, 2001; Matthews, 2013). We refer to this term as a measurement of publication output efficiency in this study. To assess the research output of countries across specialties, we first used journals listed in both the 2020 SJR and PubMed. For the 10 medical specialties, the journal category of the 2020 SJR was used, and the bibliographic records of the journal articles of 10 medical specialties published from 2017 to 2019 were downloaded from the NIH website (http://nlm.nih.gov/databases/download/pubmed_medline.html).

Considering different journal types, three types of datasets were created: a) *ALL* dataset, b) *30H* dataset, and c) *30P* dataset. The *ALL* dataset, which was created without the consideration of journal types, consisted of bibliographic records of articles published in all indexed journals across the 10 specialties. The top 30 journals from the 10 previously mentioned specialties were selected for the prolific and prestigious journal categories. The *30H* dataset included bibliographic records of articles published in the 30 journals with the highest h-index scores, whereas the *30P* dataset included bibliographic records of articles published in the 30 journals with the highest number of articles published. We defined and distinguished prestigious and prolific journals by creating the *30H* dataset for prestigious journals and the *30P* dataset for prolific journals.

In creating the datasets, some records were removed from the original downloaded data because the country names were not recognizable. Country codes were first extracted from the PubMed data (or the *ALL* dataset) based on author affiliation information. Approximately 5% of the records were removed due to missing or unrecognizable author affiliation information. In addition, country names were extracted using *libpostal*, an NLP tool for extracting international street addresses (Barrentine, 2018). The *libpostal* tool failed to correctly identify country names for approximately 4% of the datasets. Thus, approximately 9.6% of the total experimental data was excluded from the study. The research data were processed using Python and SQL, and the research results were analyzed using Excel and R.

The total number of journals and articles used in this study varied by specialty. Table 1 shows the descriptive statistics for the 10 selected specialties. On average, the *30P* dataset contained approximately one and a half times more journal articles than the *30H* dataset. The number of journals, the journal article records, and the average h-index of specialties across the three datasets varied widely. The average h-index of journals ranged from 50.7 (SURGY) to 65.9 (ONCGY) in the *ALL* dataset, from 130.8 (PEDIA) to 222.5 (ONCGY) in the *30H* dataset, and from 105.0 (PEDIA) to 171.5 (CARGY) in the *30P* dataset. Although the h-indexes in the *30H* dataset are higher than those in the *30P* dataset in each specialty, the difference among the specialties varied considerably. The varying h-indexes are indicative of the characteristics of journals in each specialty. The h-index of ONCGY is the highest (222.5) in the *30H* dataset, suggesting that there were more prestigious journals published in this specialty than in other specialties. In contrast, the h-index of PEDIA

Table 1. Descriptive statistics of three datasets

Specialties	*ALL* dataset			*30H* dataset			*30P* dataset		
	N Journals	Avg. h-index	N Articles	N Journals	Avg. h-index	N Articles	N Journals	Avg. h-index	N Articles
CARGY	278	59.0	91,745	30	202.1	28,161	30	171.5	34,042
INFEC	227	61.9	81,953	30	180.8	25,266	30	135.4	39,240
NEURO	299	63.5	103,421	30	197.4	24,734	30	148.2	39,693
ONCGY	292	65.9	141,306	30	222.5	26,070	30	154.0	61,836
ORTHO	196	51.5	59,941	30	150.2	25,848	30	137.3	28,404
PEDIA	210	53.9	63,649	30	130.8	19,960	30	105.0	27,244
PHARM	179	59.5	55,759	30	143.5	18,345	30	114.5	28,930
PSYCH	366	61.7	78,845	30	189.7	18,161	30	144.6	30,460
RADGY	248	51.3	78,173	30	152.4	25,384	30	126.5	29,721
SURGY	340	50.7	134,000	30	169.9	30,278	30	127.3	45,449
Average	263.5	57.9	88,879	30	173.9	24,121	30	136.4	36,502

CARGY, Cardiology and Cardiovascular Medicine; INFEC, Infectious Diseases; NEURO, Neurology; ONCGY, Oncology; ORTHO, Orthopedics and Sports Medicine; PEDIA, Pediatrics, Perinatology, and Child Health; PHARM, Pharmacology; PSYCH, Psychiatry and Mental Health; RADGY, Radiology, Nuclear Medicine, and Imaging; SURGY, Surgery.

 https://doi.org/10.1633/JISTaP.2022.10.2.5

(130.8) is the lowest in the *30H* dataset, suggesting that there were fewer prestigious journals published in this specialty than in other specialties. Some journals listed in the *30H* dataset are also included in the *30P* dataset, indicating that some journals are both prestigious and prolific.

The total number of journal articles used in this study is shown in Fig. 1. In addition, we used a fractional counting method in which co-authors are counted equally regardless of the author sequence (e.g., first author, second author, etc.). Fractional counting is usually preferred over whole counting in processing bibliometric data (Gauffriau, et al., 2008; Perianes-Rodriguez et al., 2016; Pritychenko, 2016). The author's country was counted proportionally to the number of co-authors, and only a fraction of the country was credited to the authors of the article.

3. RESULTS

3.1. Total Publication Outputs of 10 Specialties

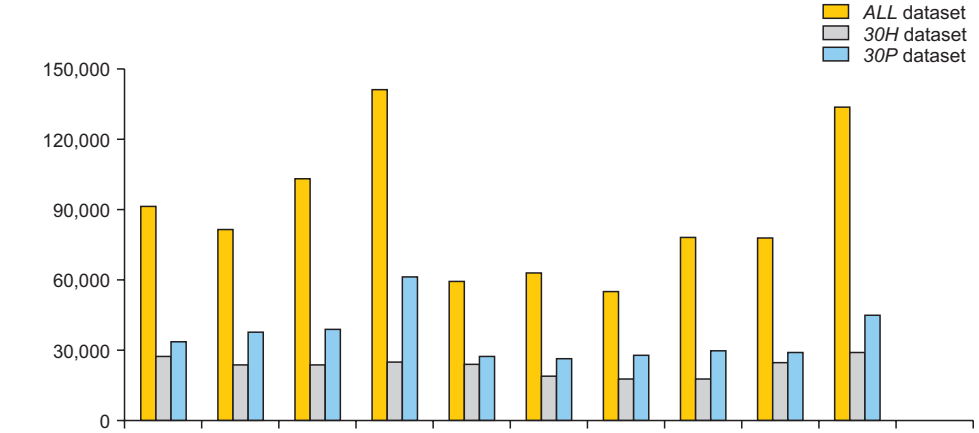
Fig. 1 illustrates differences in the total publication outputs of 10 specialties across the three datasets. The number of articles published in the *30H* dataset was considerably lower than in the other datasets across the specialties. The higher number in *30P* was not surprising, as *30P* represents prolific journals. As shown, the number of publications varied across specialties and datasets. In both the *ALL* dataset and the *30P* dataset, the number of published articles was highest in ONCGY. In contrast, the number of articles published in the *30H* dataset was highest in SURGY (30,278 articles, 12.6%). In the *ALL* dataset, the lowest number of articles was published in PHARM (55,759 articles, 6.3%), whereas the lowest number of articles in the *30H* dataset was published in PSYCH (18,161 articles, 7.5%).

3.2. Total Publication Output of the Top 10 Countries

Table 2 shows the publication output of the top 10 countries across the datasets. Except for China, the result shows that global medical research is mostly led by only a handful of developed countries, while many developing countries strive to build their medical research capacity (Rahman et al., 2020). The research output of the corresponding countries is also presented in the *30H* and *30P* datasets. As expected, the United States is the largest producer of medical research publications in all three datasets. There is a considerable gap between the total production of journal articles in the United States and other countries in the *ALL* dataset. Compared to China, the United States published approximately two and a half times more articles, six times more in the *30H* dataset, and two times more in the *30P* dataset. Compared to South Korea (ranked 10th), the United States published approximately nine times more articles in the *ALL* dataset, 15 times more in the *30H* dataset, and 10 times more in the *30P* dataset.

3.3. Relationship between the Number of Articles and Country Related Indicators

Using 2018 data from the World Health Organization (WHO), we investigated the relationships between the



Dataset type	CARGY	INFEC	NEURO	ONCGY	ORTHO	PEDIA	PHARM	PSYCH	RADGY	SURGY	All
ALL dataset	91,745 (10.3%)	81,953 (9.2%)	103,421 (11.6%)	141,306 (15.9%)	59,941 (6.7%)	63,649 (7.2%)	55,759 (6.3%)	78,845 (8.9%)	78,173 (8.8%)	134,000 (15.1%)	888,792 (100%)
30H dataset	28,161 (11.7%)	24,690 (10.3%)	24,734 (10.3%)	26,070 (10.8%)	24,848 (10.3%)	19,960 (8.3%)	18,345 (7.6%)	18,161 (7.5%)	25,384 (10.5%)	30,278 (12.6%)	240,631 (100%)
30P dataset	34,042 (9.3%)	38,431 (10.6%)	39,693 (10.9%)	61,836 (17%)	28,404 (7.8%)	27,244 (7.5%)	28,930 (7.9%)	30,460 (8.4%)	29,721 (8.2%)	45,449 (12.5%)	364,210 (100%)

Fig. 1. Total publications by specialty. CARGY, Cardiology and Cardiovascular Medicine; INFEC, Infectious Diseases; NEURO, Neurology; ONCGY, Oncology; ORTHO, Orthopedics and Sports Medicine; PEDIA, Pediatrics, Perinatology, and Child Health; PHARM, Pharmacology; PSYCH, Psychiatry and Mental Health; RADGY, Radiology, Nuclear Medicine, and Imaging; SURGY, Surgery.

Table 2. Total publications of top 10 countries

Rank (*ALL* dataset)	Country	Type of datasets		
		ALL (%)	*30H* (%)	*30P* (%)
1	United States	230,160 (38.7)	81,547 (48.4)	97,461 (38.0)
2	China	97,189 (16.3)	14,355 (8.5)	54,602 (21.3)
3	Japan	46,968 (7.9)	9,669 (5.7)	18,467 (7.2)
4	United Kingdom	41,673 (7.0)	14,755 (8.8)	16,409 (6.4)
5	Germany	40,266 (6.8)	10,531 (6.2)	14,708 (5.7)
6	Italy	35,203 (5.9)	7,478 (4.4)	13,075 (5.1)
7	Canada	28,035 (4.7)	9,745 (5.8)	11,281 (4.4)
8	France	26,191 (4.4)	7,546 (4.5)	9,973 (3.9)
9	Australia	24,913 (4.2)	7,621 (4.5)	10,574 (4.1)
10	South Korea	24,595 (4.1)	5,305 (3.1)	9,852 (3.8)
		595,193 (100)	168,551 (100)	256,402 (100)

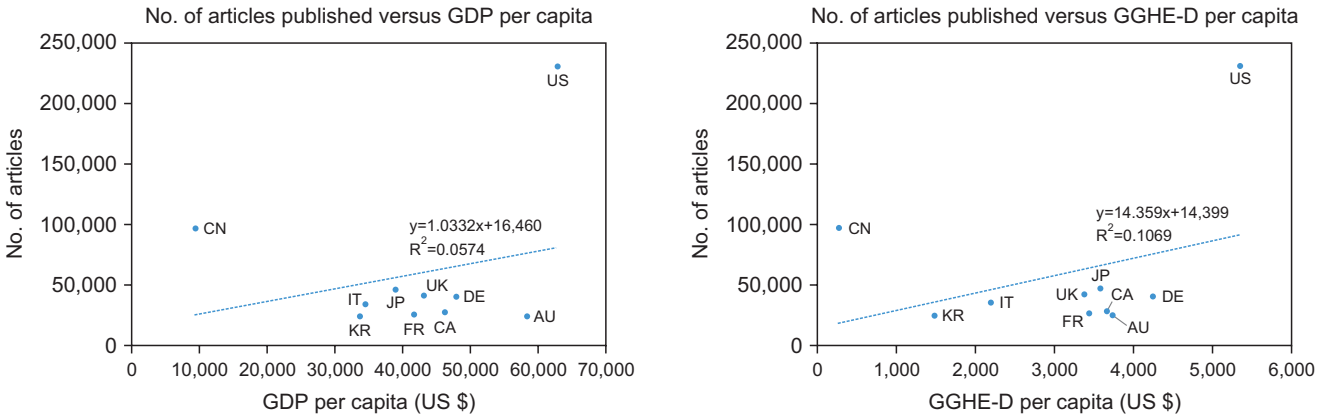


Fig. 2. Number of articles published vs. country's wealth and health expenditure. AU, Australia; CA, Canada; CN, China; DE, Germany; FR, France, IT, Italy; KR, South Korea; UK, United Kingdom; US, United States; GDP, gross domestic product; GGHE-D, total government health expenditure.

number of articles published and gross domestic product (GDP) per capita, as well as the number of articles published and total government health expenditure (GGHE-D) per capita. We found that the number of published articles increased with GGHE-D per capita. However, the R-squared values for both graphs shown in Fig. 2 indicate that there is a large variability in the trend line. In terms of number of articles and GDP per capita, the R-squared value shows that only about 5.7% of the variance can be explained by the linear regression model.

Similarly, in terms of number of articles and GGHE-D per capita, the R-squared value shows that approximately 10.7% of the variance in producing articles can be explained by the linear regression model. The United States has the highest GDP per capita and GGHE-D per capita, and it also has the highest number of articles published in medicine. In contrast, China has published the second-highest number of articles but has the lowest GDP per capita and GGHE-D per capita. As shown, the linear regression line can be used to assess a country's publication productivity in relation to other countries. When the country's wealth and health care expenditures are consid-

 https://doi.org/10.1633/JISTaP.2022.10.2.5

ered, the countries above the regression line are more productive in producing journal articles than the countries below the trend line; thus, the United States and China are more productive than most other countries.

Using the *ALL* dataset, the publication productivity of the top 10 countries was calculated relative to their population size. Similar to GDP per capita, we defined *Articles per T-Capita* as the articles produced per thousand populations and calculated the top 10 countries' *Articles per T-Capita* using the 2018 population data from the WHO (World Health Organization, 2020). *Articles per T-Capita* represent a country's publication productivity regarding medical journal articles. As shown in Table 3, *Articles per T-Capita* were the highest in Australia (1.00), whereas

Table 3. *Articles per T-Capita* across top 10 countries

Rank	Country	Articles per T-Capita	No. of articles (*ALL* dataset)	Population (1,000 head)
1	Australia	1.00	24,913	24,898
2	Canada	0.76	28,035	37,075
3	United States	0.70	230,160	327,096
4	Germany	0.67	40,266	60,484
5	United Kingdom	0.63	41,673	66,274
6	Japan	0.57	46,968	82,792
7	Italy	0.53	35,203	66,919
8	South Korea	0.48	24,595	51,172
9	France	0.21	26,191	127,202
10	China	0.07	97,189	1,427,648

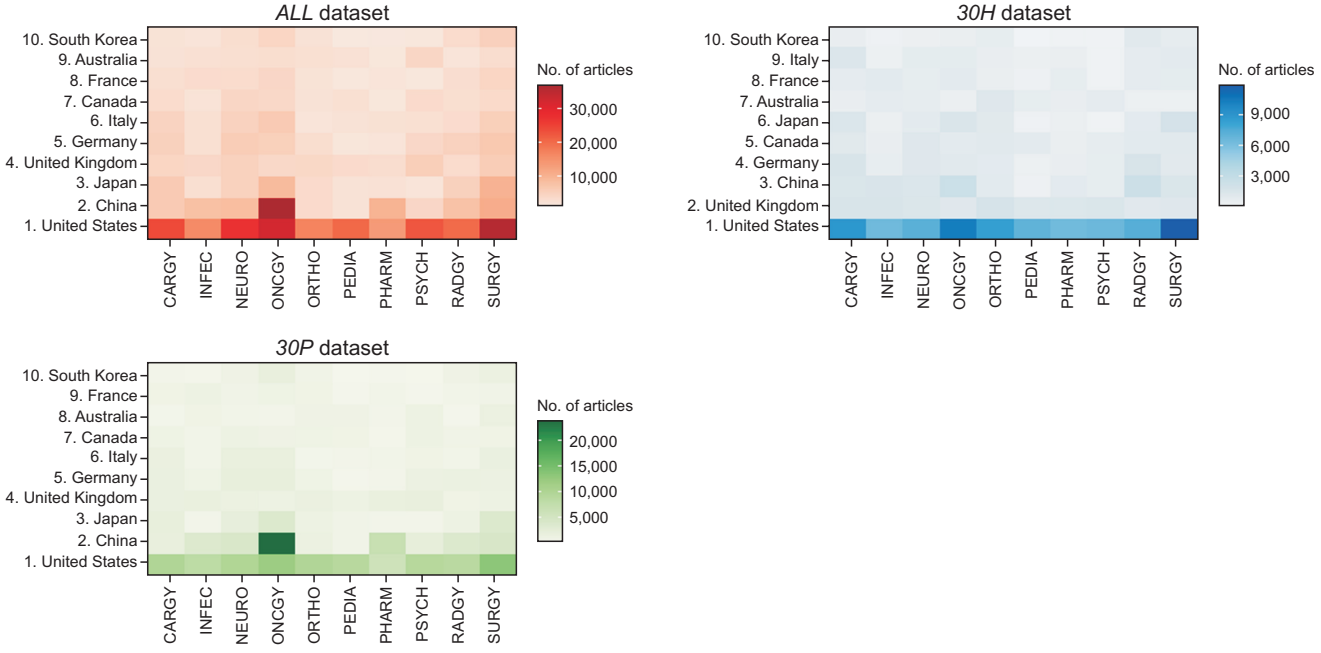


Fig. 3. Publication counts of top 10 countries' specialties. The numbers on the left side of each country name indicate the rank in producing journal articles. CARGY, Cardiology and Cardiovascular Medicine; INFEC, Infectious Diseases; NEURO, Neurology; ONCGY, Oncology; ORTHO, Orthopedics and Sports Medicine; PEDIA, Pediatrics, Perinatology, and Child Health; PHARM, Pharmacology; PSYCH, Psychiatry and Mental Health; RADGY, Radiology, Nuclear Medicine, and Imaging; SURGY, Surgery.

China published the lowest number of articles (0.07) according to this metric. Thus, when population size was taken into account, Australia was the most productive, and China was the least productive country in producing journal articles.

3.4. Number of Articles in Top Countries' Specialties

The number of published articles varied considerably across the specialties, countries, and datasets. Fig. 3 represents the raw publication counts of the top 10 countries' specialties in the *ALL*, *30H*, and *30P* datasets. China showed the most distinctive publishing pattern. Compared with other countries, China published the highest number of articles in ONCGY in the *ALL* dataset. In the *30P* dataset, the number of China's publications in ONCGY is greater than the number of publications produced in any other country's specialty. The dominance of the United States in medical research can also be noticed in this figure. Except for China in ONCGY, the United States published more articles than any other country in all specialties. The number of articles published by the United States in SURGY in the *ALL* dataset is the second highest across all specialties. In contrast to the publication patterns in the *30P* dataset, the United States consistently published more articles in the *30H* dataset than any other country in all specialties.

		Australia	Canada	China	France	Germany	Italy	Japan	South Korea	United Kingdom	United States	Average
ALL dataset	CARGY	8.0%	11.4%	6.4%	9.8%	12.6%	13.1%	13.2%	7.7%	10.2%	10.5%	10.1%
	INFEC	9.6%	6.4%	8.1%	12.0%	6.2%	7.0%	5.5%	7.0%	9.4%	7.0%	7.5%
	NEURO	10.9%	14.5%	8.5%	11.8%	14.4%	13.9%	10.5%	11.4%	11.9%	12.0%	11.6%
	ONCGY	11.2%	13.3%	38.1%	15.2%	13.1%	17.5%	18.4%	17.7%	9.1%	14.1%	18.2%
	ORTHO	10.1%	7.4%	3.6%	7.3%	7.4%	4.8%	7.4%	8.6%	9.2%	7.4%	6.9%
	PEDIA	9.2%	8.6%	2.1%	5.0%	3.7%	6.0%	4.5%	3.7%	7.9%	8.9%	6.5%
	PHARM	5.6%	4.9%	10.1%	6.6%	4.3%	6.3%	4.9%	4.5%	7.3%	5.9%	6.4%
	PSYCH	16.4%	11.7%	4.1%	5.1%	9.7%	7.2%	3.7%	5.2%	13.2%	9.8%	8.5%
	RADGY	7.1%	9.5%	7.9%	10.9%	12.4%	8.9%	10.8%	13.3%	7.9%	8.8%	9.2%
	SURGY	12.0%	12.1%	11.1%	16.3%	16.1%	15.3%	21.1%	20.9%	13.9%	15.7%	15.2%
	All	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
30H dataset	CARGY	8.3%	12.4%	10.7%	12.1%	15.7%	18.8%	15.2%	11.7%	11.2%	11.0%	11.9%
	INFEC	11.7%	6.5%	10.9%	13.9%	6.8%	6.4%	5.9%	6.0%	11.3%	8.1%	8.6%
	NEURO	11.2%	13.7%	10.3%	10.7%	12.6%	11.7%	9.6%	8.9%	10.4%	9.0%	10.1%
	ONCGY	7.4%	9.4%	17.6%	12.4%	10.5%	11.8%	15.7%	11.6%	8.4%	12.8%	12.3%
	ORTHO	17.6%	11.6%	7.1%	8.1%	9.4%	8.5%	12.1%	14.4%	12.4%	10.5%	10.7%
	PEDIA	10.6%	9.6%	2.9%	5.3%	4.7%	7.4%	3.3%	2.1%	9.4%	8.7%	7.4%
	PHARM	8.4%	6.3%	7.0%	10.7%	6.1%	7.7%	5.9%	5.2%	9.6%	7.9%	7.7%
	PSYCH	11.9%	8.7%	5.2%	3.2%	7.5%	3.5%	2.5%	3.4%	10.4%	8.2%	7.4%
	RADGY	6.3%	10.5%	17.5%	12.0%	16.4%	12.0%	10.3%	21.1%	7.7%	9.1%	10.8%
	SURGY	6.7%	11.4%	10.7%	11.7%	10.3%	12.3%	19.6%	15.7%	9.1%	14.7%	13.1%
	-	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
30P dataset	CARGY	6.6%	10.8%	3.8%	11.1%	12.5%	13.8%	11.8%	7.8%	11.3%	10.3%	9.2%
	INFEC	11.0%	7.9%	6.9%	13.9%	8.1%	6.8%	4.3%	5.8%	11.7%	8.7%	8.2%
	NEURO	8.9%	12.3%	7.8%	10.9%	14.7%	15.1%	12.7%	12.5%	9.9%	10.2%	10.5%
	ONCGY	8.2%	11.2%	43.9%	12.9%	14.4%	15.3%	20.8%	21.0%	8.6%	12.4%	19.9%
	ORTHO	12.0%	10.5%	3.1%	11.8%	8.1%	5.4%	8.0%	10.3%	10.9%	10.1%	8.3%
	PEDIA	11.7%	10.3%	1.8%	4.9%	3.8%	6.4%	5.9%	3.0%	8.4%	9.4%	6.7%
	PHARM	7.3%	5.8%	13.1%	9.4%	5.8%	7.3%	4.2%	5.1%	11.5%	6.3%	8.1%
	PSYCH	13.7%	11.6%	4.4%	5.6%	10.5%	8.9%	4.5%	4.5%	12.6%	9.6%	8.2%
	RADGY	4.5%	9.3%	7.0%	8.8%	11.6%	6.7%	7.2%	12.9%	6.9%	9.2%	8.4%
	SURGY	16.1%	10.4%	8.2%	10.8%	10.4%	14.2%	20.7%	17.2%	8.1%	13.8%	12.5%
	All	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Fig. 4. Publication share of specialties within countries. CARGY, Cardiology and Cardiovascular Medicine; INFEC, Infectious Diseases; NEURO, Neurology; ONCGY, Oncology; ORTHO, Orthopedics and Sports Medicine; PEDIA, Pediatrics, Perinatology, and Child Health; PHARM, Pharmacology; PSYCH, Psychiatry and Mental Health; RADGY, Radiology, Nuclear Medicine, and Imaging; SURGY, Surgery.

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3.5. Publication Share of Specialties within Countries

We compared the publication share of the top 10 countries' specialties across all of these countries and across datasets. As shown in Fig. 4, the sum of all publication shares of the specialties in each country is 100%. China showed the most distinctive pattern of publication in terms of the publication share of individual specialties. In the *ALL* dataset, the number of articles published by China was the highest in ONCGY (38.1%). In the *30P* dataset, China's publication share in ONCGY (43.9%) was greater than that of any other country across all specialties. Furthermore, China also had the lowest publication share across all three datasets in PEDIA (2.1%) within the *ALL* dataset.

The average publication share of specialties, which is shown on the right side of Fig. 4, was calculated by taking the average share across all countries. An equal average percentage share of publications would be 10% because there are ten specialties. However, the actual average publication share varied widely, and the highest average publication share was found in the *30P* dataset in ONCGY. In the *ALL* dataset, the high average publication share of ONCGY (18.2%) was partly due to China's exceptionally high number of publications in this specialty. In the same dataset, the lowest publication share was that of PHARM (6.4%).

3.6. Comparing Proportions of Publications Using Ratios

Publication output can vary widely between two journal types — prestigious and prolific. Considering this distinction, we developed the *30H-All Ratio* and the *30P-All Ratio* to compare publication proportions within a dataset and between two datasets. The *30H-All Ratio* measures the relative proportion of articles published in prestigious journals within a specialty or country. Because the *30H* dataset consists of the top 30 journals by h-index scores, the *30H-All Ratio* is defined as follows:

$$30H\text{-}All\ Ratio = \frac{Publications\ of\ Country's\ Specialty\ in\ the\ 30H\ Dataset}{Publications\ of\ Country's\ Specialty\ in\ the\ ALL\ Dataset}$$

The *30P-All Ratio* measures the relative proportion of articles published in prolific journals within a specialty or country. Because the *30P* dataset consists of the top 30 journals that published the highest number of articles, it is defined as follows:

$$30P\text{-}All\ Ratio = \frac{Publications\ of\ Country's\ Specialty\ in\ the\ 30P\ Dataset}{Publications\ of\ Country's\ Specialty\ in\ the\ ALL\ Dataset}$$

Fig. 5 shows the empirical results of applying the *30H-All Ratio* and *30P-All Ratio* to the top 10 countries' specialties. The highest *30H-All Ratio* is found in ORTHO

		Australia	Canada	China	France	Germany	Italy	Japan	South Korea	United Kingdom	United States	Average
30H dataset	CARGY	0.32	0.38	0.25	0.35	0.33	0.30	0.24	0.33	0.39	0.37	0.33
	INFEC	0.37	0.35	0.20	0.33	0.29	0.19	0.22	0.18	0.42	0.41	0.33
	NEURO	0.31	0.33	0.18	0.26	0.23	0.18	0.19	0.17	0.31	0.27	0.25
	ONCGY	0.20	0.25	0.07	0.23	0.21	0.14	0.17	0.14	0.33	0.32	0.19
	ORTHO	0.54	0.54	0.29	0.32	0.33	0.37	0.33	0.36	0.48	0.50	0.44
	PEDIA	0.35	0.39	0.21	0.30	0.33	0.26	0.15	0.12	0.42	0.35	0.33
	PHARM	0.46	0.44	0.10	0.47	0.36	0.26	0.25	0.25	0.47	0.48	0.34
	PSYCH	0.22	0.26	0.19	0.18	0.20	0.10	0.14	0.14	0.28	0.30	0.25
	RADGY	0.27	0.38	0.33	0.32	0.35	0.29	0.20	0.34	0.35	0.37	0.33
	SURGY	0.17	0.33	0.14	0.21	0.17	0.17	0.19	0.16	0.23	0.33	0.24
	Average	0.31	0.35	0.15	0.29	0.26	0.21	0.21	0.22	0.35	0.35	0.28
30P dataset	CARGY	0.35	0.38	0.34	0.43	0.36	0.39	0.35	0.40	0.44	0.41	0.39
	INFEC	0.49	0.49	0.48	0.44	0.48	0.36	0.31	0.33	0.49	0.53	0.47
	NEURO	0.35	0.34	0.51	0.35	0.37	0.40	0.48	0.44	0.33	0.36	0.39
	ONCGY	0.31	0.34	0.65	0.32	0.40	0.33	0.44	0.47	0.37	0.37	0.47
	ORTHO	0.50	0.57	0.49	0.61	0.40	0.42	0.42	0.48	0.47	0.58	0.52
	PEDIA	0.54	0.48	0.49	0.37	0.37	0.39	0.52	0.33	0.42	0.45	0.45
	PHARM	0.56	0.47	0.73	0.54	0.48	0.43	0.33	0.45	0.62	0.46	0.54
	PSYCH	0.35	0.40	0.60	0.41	0.39	0.46	0.47	0.35	0.38	0.41	0.42
	RADGY	0.27	0.39	0.50	0.31	0.34	0.28	0.26	0.39	0.35	0.44	0.39
	SURGY	0.57	0.34	0.42	0.25	0.24	0.34	0.39	0.33	0.23	0.37	0.36
	Average	0.42	0.40	0.56	0.38	0.37	0.37	0.39	0.40	0.39	0.42	0.43

Fig. 5. *30H-All Ratio* and *30P-All Ratio* of top 10 countries' specialties. Blue indicates a low ratio, whereas red indicates a high ratio. The intensity of the color indicates the degree of the ratio. CARGY, Cardiology and Cardiovascular Medicine; INFEC, Infectious Diseases; NEURO, Neurology; ONCGY, Oncology; ORTHO, Orthopedics and Sports Medicine; PEDIA, Pediatrics, Perinatology, and Child Health; PHARM, Pharmacology; PSYCH, Psychiatry and Mental Health; RADGY, Radiology, Nuclear Medicine, and Imaging; SURGY, Surgery.

Table 4. Frequency counts of the greater-than-average *30H Ratios* and *30P Ratios*

Ratio type	Grand average	Frequency count									
		Australia	Canada	China	France	Germany	Italy	Japan	South Korea	United Kingdom	United States
30H-ALL	0.30	7	9	1	6	5	2	1	3	9	9
30P-ALL	0.44	5	4	9	2	2	1	4	4	3	5

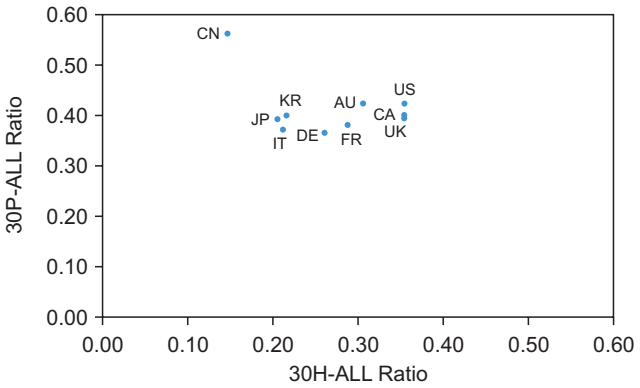

Fig. 6. *30P-All Ratios* and *30H-All Ratios* by country. AU, Australia; CA, Canada; CN, China; DE, Germany; FR, France, IT, Italy; KR, South Korea; UK, United Kingdom; US, United States.

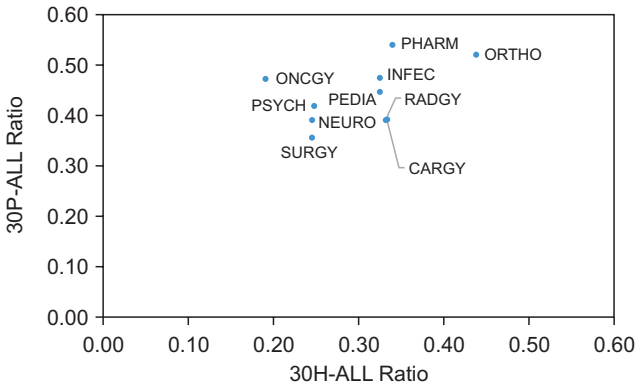

Fig. 7. *30P-All Ratios* and *30H-All Ratios* of specialties. CARGY, Cardiology and Cardiovascular Medicine; INFEC, Infectious Diseases; NEURO, Neurology; ONCGY, Oncology; ORTHO, Orthopedics and Sports Medicine; PEDIA, Pediatrics, Perinatology, and Child Health; PHARM, Pharmacology; PSYCH, Psychiatry and Mental Health; RADGY, Radiology, Nuclear Medicine, and Imaging; SURGY, Surgery.

of Australia (0.54) and ORTHO of Canada (0.54), shown in red. The lowest *30H-All Ratio* is found in ONCGY of China (0.07). Looking at the *30H-All* Ratio, China is mostly shown in blue, indicating that publication in most specialties was not the result of publishing in prestigious journals. On the other hand, the highest *30P-All Ratio* is found in PHARM from China (0.73). The lowest *30P-All Ratio* is found in SURGY of the United Kingdom (0.23), which indicates that this specialty within this country had the lowest proportion of publications published in prolific journals. The *30P-All Ratio* of the countries' specialties is mostly shown in red, indicating that considerably more publications were published in prolific journals than in prestigious journals.

To further examine the overall publication productivity of countries' specialties, we obtained the grand average by averaging the *30H-ALL Ratio* and *30P-ALL Ratio* across all specialties and countries. Then, we counted greater-than-grand average (GTGA) *30H-All Ratios* and GTGA *30P-All Ratios*. As shown in Table 4, the grand average of the *30P-All Ratio* (0.44) is much greater than the grand average of the *30H-All Ratio* (0.30), which suggests that greater proportions of articles are published in prolific rather than prestigious journals. In terms of countries, the United States (9), the United Kingdom (9), and Canada (9) show the highest greater-than-average *30H-All Ratios*, whereas China (9) shows the highest GTGA *30P-All Ratio*. Therefore, in most specialties, authors from the United States, the United Kingdom, and Canada tend to publish more in prestigious journals, whereas authors from China tend to publish in prolific journals.

The *30P-All Ratio* of countries was obtained by calculating the average *30P-All Ratios* of the countries' specialties. Similarly, the *30H-All Ratio* of countries was obtained by calculating the average *30H-All Ratios* of the countries' specialties. Fig. 6 shows a scatterplot of the *30P-All Ratios* and *30H-All Ratios* of the top 10 countries. China had the lowest *30H-All Ratio* (0.15) but the highest *30P-All Ratio* (0.56). This suggests that authors from China mainly published articles in prolific journals rather than in prestigious journals. The United Kingdom, Canada, and the United States had the highest *30H-All Ratios* (0.35). Authors from these Western countries published a greater proportion of their articles in prestigious journals and a smaller proportion of their articles in prolific journals.

 https://doi.org/10.1633/JISTaP.2022.10.2.5

Compared with Western countries, East Asian countries, namely China, South Korea, and Japan, had the lowest *30H-All Ratios*.

We also calculated the *30H-All Ratios* and the *30H-All Ratios* of specialties by averaging the *30H-All Ratios* andthe *30H-All Ratios* of all 10 leading countries. Fig. 7 illustrates a scatterplot of the *30H-All Ratios* and *30P-All Ratios*of specialties. ORTHO had the highest *30H-All Ratio* (0.44) with a relatively high *30P-All Ratio* (0.52). PHARM had the highest *30P-All Ratio* (0.54). This indicates that a substantial proportion of the articles in ORTHO and PHARM were published in both prolific and prestigious journals. Compared to other specialties, SURGY had a relatively low number of published articles in prolific or prestigious journals since SURGY had the lowest *30P-All Ratio* (0.36) and a relatively low *30H-All Ratio* (0.24).

4. DISCUSSION AND CONCLUSIONS

To our knowledge, this is the first study to examine the publication output of leading countries in regard to specific specialties using the large PubMed dataset. The top 10 countries we identified in terms of medical journal article production are similar to those of previous studies, such as Fontelo and Liu (2018) and Conte et al. (2017). While these studies used PubMed data, they used more specific document types (e.g., clinical studies) and a much smaller number of journals.

The results showed that publication productivity varied widely across countries and specialties and depended on several key factors. These were the country's population, its wealth and health expenditures, and the types of journals that authors tend to publish in. In terms of population size, Australia was the most productive, whereas China was the least productive. In terms of total publication output, it was not surprising to find that the United States was the most dominant in producing articles, accounting for 39% of all articles published by the top 10 countries in medicine. Compared with other top countries, the United States and China were more productive in producing articles considering their wealth and health expenditures. Both GDP per capita and GGHE-D per capita seem to have a positive correlation with the number of articles published by countries, which is consistent with the findings that GDP affects health care spending (Jakovljevic et al., 2020).The findings of this study support the study of Lin et al. (2018), as the number of articles published increased along with GDP per capita. In addition, the total research output of a country can be calculated by taking into account the wealth and health care expenditure of the country. Compared to most other countries, the United States and China were more productive when their wealth and health spending were considered.

To compare the output of the specialties across the top 10 countries in terms of prestigious and prolific journals, we formulated the *30H-All Ratio* and *30P-All Ratio*. In terms of specialties, the total research production in oncology was highest in ONCGY, partly due to the large volume of articles published by China. Overall, the highest number of articles were published in ONCGY, whereas the lowest number of articles were published in PHARM. China showed the greatest variability in terms of specialty, as its publications in ONCGY were exceptionally high compared with the specialties of other countries. China's publications in ONCGY exceeded even those of the United States in ONCGY. We believe *30H-All Ratio* and *30P-All Ratio* are effective in comparing publication proportions between specialties, a country's specialty, and the country as a whole.

China's high publication productivity was mostly due to publications in prolific rather than prestigious journals. Chinese authors in ONCGY also published a relatively low number of journal articles in more reputable journals. In general, authors from China in most specialties tended to publish in prolific journals, whereas authors from the United States, United Kingdom, and Canada in most specialties tended to publish in more prestigious journals. These countries also published a moderate number of journal articles in prolific journals. In contrast, East Asian countries (China, Japan, and South Korea) showed more distinct preferences in terms of journal type. Unlike the Western countries, these countries published more in prolific rather than prestigious journals. The strict editorial standards of journals pose a particular challenge for authors from non-Western countries (Oh et al., 2019). This may be one of the reasons why researchers from East Asian countries lag behind leading Western countries in publishing in more prestigious journals.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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JISTaP http://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 10(2): 86-101, 2022

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2022.10.2.6

Factors Influencing New Media Exposure of Political News by Youths in Isan Society

Khanittha Jitsaeng*
Department of Information Sciences, Faculty of Humanities and Social Sciences, Khon Kaen University, Khon Kaen, Thailand
E-mail: jkhani@kku.ac.th

Juthatip Chaikhambung
Department of Information Sciences, Faculty of Humanities and Social Sciences, Khon Kaen University, Khon Kaen, Thailand
E-mail: cjutha@kku.ac.th

ABSTRACT

This research aimed at studying the factors that influence new media exposure of political news by youths in Isan society in Thailand. The target group comprised 1,200 individuals, obtained from multi-stage sampling from undergraduate students in Isan's autonomous universities, governmental universities, and private institutions. The data collection tool was a questionnaire, the content of which was validated by experts. The reliability of the tool was tested by the formula for Cronbach's alpha coefficient, which yielded a reliability of 0.83. Multiple regression analysis was applied to analyze the data. The results, regarding factors influencing the channels for political news exposure, showed that channels for political news exposure were mostly influenced by inner drives, followed by importance in political news exposure, influence from social networks, and specific characteristics of the Internet. This could explain the variation of channels for political news exposure at 46.5%. In terms of factors influencing political news selection, it was found that political news selection was influenced mostly from social networks, followed by inner drives, benefits from political news exposure, specific characteristics of the Internet, and the field of study. The variation of the political news selection could be explained at 44.6%. These results elaborate on the current situation in Thailand, especially in Isan region, where youths in higher education are playing an increasing role in demonstrating their political stance through various political activities.

Keywords: factors, exposure to news, politics, youths, Isan

Received: April 18, 2022 **Revised:** May 20, 2022
Accepted: June 14, 2022 **Published:** June 30, 2022

***Corresponding Author:** Khanittha Jitsaeng
https://orcid.org/0000-0002-1826-3883
E-mail: jkhani@kku.ac.th

1. INTRODUCTION

In today's world, Internet technology and the distribution of news through online systems have changed the behavior of individuals to news exposure, and enable everyone to have access to the news via a wireless Internet connection and a portable communication device. Consequently, exposure to the news has become part of daily living far more so than in the past.

News or information is selected owing to several factors. Convenience, rapidity, and cost-free are the key factors enhancing receivers' new media exposure in the present world (Jun, 2012; Tasente, 2020). New media is defined as the interaction of integrated media with the use of a digital code, referred to as multimedia, interactive media, or digital media; such include online and social media (van Dijk, 2006). It has further been reported that the need for information, as well as personal interests, are the major motivations behind media exposure to news (Jun, 2012). Interest is the factor provoking in-depth news following, notwithstanding whether the receiver has or does not have the intention to open oneself to the information. The result is the receiver's cognizance and ability to keep up-to-date with various social happenings (Dahlgren, 2019). Moreover, due to individual interests, people have become more open to political heterogeneity (Garrett, 2009), as well as to the important news that may influence one's exposure. People have become more motivated to expose themselves to counter-attitudinal political information (Brundidge, 2010) because they are aware of the importance of the news to their lives, both in education and social interaction. It can thus be said that in addition to understanding, people also seek news to enhance their knowledge, guide their decisions, or address their interests. When an influence from media is involved, Parmelee and Perkins (2012) stated that friends and family members are important stimulators for receivers to open themselves to online political news. In addition, it has been found that the specific characteristics of media, such as interaction, links, anonymity, and unlimited space and time, affect the media exposure, perception of accuracy, credibility of the media, and individual characteristics of receivers, including education, income, sex, and hometown; all of which affect an individual's exposure to news, as well as their openness to different types of news.

Isan is in the northeast of Thailand. Covering 20 provinces, the north and east are adjacent to Lao PDR and the south is connected with Cambodia. This area is the heart of the national election, owing to the greatest population number in the country compared to other regions, at 28.7% or 18 million people. The election rights of Isan's total population are the highest of all regions at 17 million, among Thailand's 51 million people with election rights. Thus, the region is home to important targets of election campaigns. Receiving the Isan people's votes means the chance to win in the national election (Sutthichaya, 2019), as politicians and political parties build their popularity from the people in the regions who have the right to vote. First-time voters in the region account for as much as 14% or 7.3 million votes (Thai Public Broadcasting Service, 2019). Meanwhile, relevant organizations, such as Parliament and the Office of the National Election Board have attempted to promote political news exposure among this group, to build informed citizens and promote political cognizance, which is the heart of democratic social development.

Nevertheless, no past research studies had been conducted on the factors influencing political news exposure of youths in Thailand's Isan society. There are, moreover, few studies on the factors affecting exposure to political news in international contexts. Thus, there is insufficient knowledge for analysis and understanding of the behavior related to political news exposure of these impressionable individuals. Furthermore, their behavior changes with the context of various media. Research has confirmed that youths are mostly exposed to online news, especially from social media (Jun, 2012; Tasente, 2020), but nothing is known about the factors that lead to such behavior in the Thai social context, especially in Isan, where the proportion of Internet use is the highest in Thailand (Electronic Transaction Development Agency (Public Organization), 2020). As a result, more youths in this region are alert to politics (Muakchim, 2021), as media has a major role in providing political information and news to people in a democratic society, to encourage informed citizens and broaden their political horizons.

This leads to research questions as to what factors influence new media exposure to political news and how much influence they have on political news exposure. This research was thus aimed to study the "factors influencing new media exposure to political news by youths in Isan society." The outcome would be guidelines for the development of youths to catch up with information and news and to take part in politics according to their rights and duty, leading eventually to democratic societal development.

This research not only completes the body of knowledge in this aspect but is also an important basis for

understanding the cause and motivation for the online political news exposure of the region's younger citizens. Benefits will further promote behavior toward news exposure in the required directions.

2. RELATED LITERATURE REVIEWS

2.1. Theories Related to Media Exposure

Nowadays, media landscapes have changed, bringing about the fragmentation of audiences or news receivers following various forms of behavior in news exposure depending on channels and sources of information. This leads to greater challenges of media exposure (Shi & Nagler, 2020).

Slater (2004) defined media exposure as the extent to which an audience is facing certain messages of media content in which news is being presented through one of several various media sources. Encountering a piece of news may occur by watching or listening. In addition, news exposure provides the opportunity for an audience to receive news via different channels. Various media have different roles in responding to the needs of receivers, such as generating participation or establishing a level of credibility (Qader & Zainuddin, 2011).

Media exposure includes the degree of intention in opening oneself to news through different channels, from no attention at all to the levels of connection to the news perceived (de Vreese & Neijens, 2016). The study of de Vreese and Neijens (2016) categorized five types of media exposure measures through self-reporting on several dimensions, namely 1) Type of recall – for instance, free recall, aided recall, or cued recall; 2) Timeframe – referring to a study of the past, the present, daily, weekly, or monthly; 3) Unit of observation – exposure to a medium type such as mass media and new media, including specific genres, such as advertisement and drama, and a specific vehicle, such as *The New York Times*, etc.; 4) Conceptualization of exposure – focusing on frequency, time spent, objectives or intention of the content, social diffusion (van Den Putte et al., 2011); and 5) Different situations/locations – in which situations or locations of news exposure are studied.

Researchers studied media exposure as a dependent variable based on the unit of observation, including the medium type. These include new media, the specific genre, such as news topics, and the specific vehicle, such as Thairat TV, Nation TV, etc. Additionally, the studies were based on the conceptualization of exposure, which involves the frequency and time spent, as well as the intention or objective of exposure. This research limited the scope of political news exposure in three aspects: the behavior involved in the follow-up of political news, the channel of political news exposure, and the political news selected.

2.2. Factors Influencing Political News Media Exposure

People's media exposure is influenced by several factors, particularly their different backgrounds. Sex, income, age, education, and social condition are found to affect one's media exposure. Sex and education in this regard receive the greatest interest from academics, similar to the importance placed on media exposure, in people's studies, daily life, and social interactions, all of which have major roles in promoting an individual's media exposure (Benkler, 2006; Donohew & Tipson, 1973). The mechanisms of new media and the hyperlink system enhance the chances of exposure to counter-attitudinal perspectives, especially when it comes to political news. The news that people are exposed to may be useful for each individual in a different dimension. The benefit of news exposure, therefore, covers rapidity or immediateness (Sveningsson, 2015), while convenience and the low cost of exposure are considered structural benefits, owing to the property of new media (Jun, 2012). An individual also opens to news perception with expectations related to emotional management or diversion, for example, an escape from routines, lessening boredom, and killing time (Diddi & LaRose, 2006; Meijer & Kormelink, 2015). The psychological factor from the viewpoint of McCombs and Becker (1979) and DeFleur (1996) corresponds to a study by Benkler (2006) which stated that an "inner drive" motivates political news exposure, and is divided into the interest and need for political news (Brundidge, 2010; Jun, 2012; Merill & Lowenstein, 1971; Schramm, 1973) that results in one's exposure to different views.

Parmelee and Perkins (2012) stated that family members, friends, or acquaintances act as a trigger for social utility. Thus, communication from social ties may direct people to seek political information online. Moreover, the different characteristics of media also correlate to the capabilities of news exposure via an individual's senses of perception. This agreed with Benkler (2006) which said that the functioning structure of a media that enhances the operations of websites and online social networks, which came to exist owing to the advancement of Web 2.0 technology, is the property that enhances political news exposure from new media (Choi, 2016; Jun, 2012). Addi-

 https://doi.org/10.1633/JISTaP.2022.10.2.6

Table 1. Conclusion of factors influencing media exposure

Factors influencing news exposure	Schramm (1973)	Merrill & Lowenstein (1971)	Donohew & Tipton (1973)	McCombs & Becker (1979)	DeFleur (1996)	Benkler (2006)	Brundidge (2010)	Jun (2012)	Parmelee & Perkins (2012)	Choi (2016)	Total (Frequency)
1. Different background	✓	✓			✓		✓	✓	✓	✓	7
- Sex		✓			✓		✓	✓	✓	✓	6
- Age					✓		✓	✓	✓	✓	5
- Income					✓		✓	✓	✓	✓	5
- Education	✓	✓			✓		✓	✓	✓	✓	7
- Social condition	✓	✓			✓		✓				4
2. Importance of news exposure			✓			✓	✓	✓	✓		5
3. Benefits from news exposure	✓	✓	✓				✓	✓		✓	6
4. Inner drives	✓	✓	✓	✓	✓	✓	✓	✓		✓	9
- Interest in the news		✓			✓		✓	✓		✓	5
- Needs for news	✓		✓	✓				✓		✓	5
- Increasing politics cognizance			✓	✓						✓	3
- Catching up with news			✓	✓							2
- Reinforcing existing political viewpoints			✓					✓			2
- Obtaining recommendations for practices related to politics			✓								1
5. Ability in news exposure	✓										1
6. Personality	✓				✓						2
7. Attitudes	✓				✓		✓				3
8. Experiences	✓										1
9. Traditional media influences									✓		1
10. Influences from groups/ social networks			✓		✓	✓		✓	✓	✓	6
11. Specific characteristics of the media (the Internet)		✓				✓	✓	✓	✓	✓	6

tionally, the perception of accuracy and credibility of media affect selective news exposure in different dimensions. Studies had reported that perception of online media credibility correlated with the use of online media (Johnson & Kaye, 2000), and that media credibility correlates with dependency on media. An individual relies more on online media if the media is more credible. Contrarily, an individual relies upon or utilizes online media less if he or she sees it as having less credibility (Weeks & Lane, 2020).

As presented in Table 1, the high-frequency factors that have attracted the attention of scholars from past to present were selected to be studied in this research as independent variables because they have a high influence on media exposure.

From the review of related literature, researchers developed a research conceptual framework by setting two independent variables: (1) personal characteristics consisting of sex and field of study (Brundidge, 2010; Choi, 2016; Jun, 2012; Parmelee & Perkins, 2012; Sarawanawong et al., 2017); and (2) the motivation behind online media exposure to political news, including the importance of political news, benefits from political news exposure, inner drive, influences from groups/networks, and specific media characteristics (Benkler, 2006; Choi, 2016; Jun, 2012; Parmelee & Perkins, 2012). Political news exposure of youths from new media remained the dependent variable. The study herein covers three issues: the behavior of Internet users in following political news, channels for political news exposure, and the political news issues selected for exposure (de Vreese & Neijens, 2016). The factors influencing media exposure of individuals are depicted in Table 1 and the conceptual framework of this study is presented in Fig. 1.

3. RESEARCH METHODOLOGY

This study applied the Quantitative Research method. The population under the study was students aged 18-22 years who were studying in one of the 30 tertiary educational institutions in the Isan region, which included three autonomous universities, 19 governmental universities, and eight private universities. The total population was 276,497. Reports were sent via the Ministry of Higher Education, Science, Research and Innovation to each educational institution, as the Ministry is responsible for supervising institutions of higher education in Thailand. Student information can be accessed through the website of the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (2021, http://info.mhesi.go.th/newinfo). The size of the student number in each group of universities was based on the formula of Taro Yamane (Yamane, 1973), which was 400 students, or a total of 1,200. The reliability level was 95%.

The Multi-Stage Sampling technique was used to obtain the sample group. The first step was simple random sampling, by drawing lots to obtain the institutions that represented each type of university. The students were then categorized into groups according to the programs offered at the universities, which were science and technology, health sciences, and humanities and social sciences, that agree with the educational principles of the Thailand Higher Education Institution (Ministry of Higher Education, Science, Research and Innovation, 2018). The three groups covered all program fields open in the universities and reflected the different interests of students, according to their fields of study. The next step was systematic random sampling, conducted by assigning the cardinal order in the student rosters obtained from the universities' registration divisions. After the online questionnaires were returned, they were appropriately accounted for. Any questionnaire that appeared to be incomplete was removed. Systematic sampling had to be performed again for replacement, and more questionnaires were sent online to the students to obtain a total of 1,200 forms, which meant 100% of the respondents.

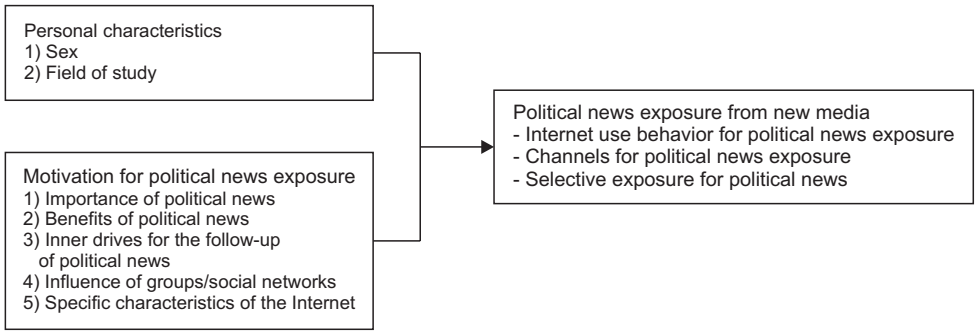

Fig. 1. Conceptual framework.

 https://doi.org/10.1633/JISTaP.2022.10.2.6

The research tool used for the collection of data was the questionnaire. The content validity of the questionnaire was checked using the Index of Item-Objective Congruence (IOC), and five content experts gave recommendations for improved quality (the IOC of each question was 0.8-1.0). After improvement, the questionnaire was tested for reliability through the responses of 30 students of Khon Kaen University, Nong Khai Campus. The Cronbach's alpha coefficient was 0.83, demonstrating that the quality of the questionnaire was sufficient for subsequent data collection. The reliability and Cronbach's alpha coefficient are presented in Table 2.

The collection of data was authorized by each of the universities. The registration division of each university and the lecturer of each program were approached before the questionnaire was sent online to students or through the program lecturer via e-mail after the request was made. Data collection was performed from July through November 2021.

The questionnaire was developed from concepts, theories, and research related to political news and exposure among youths, consisting of three parts:

1) Questions about the personal attributes of youths
2) Questions about motivation for political news exposure
3) Questions about political exposure consisting of the study of the three following issues:
   - Questions about behavior when using the Internet to keep up with political news
   - Questions about channels for youths' political news exposure
   - Questions about selected political news

Data analyses were performed by descriptive statistics including Frequency, Percentage, Mean, and Standard Deviation (S.D.) to test the chi-square test of the independent variables that influenced one another: the youth's characteristics, and the motivation behind political news exposure from the Internet; and one dependent variable: political news exposure of the youths from new media. The study covered three aspects: Internet use behavior in following political news, channels for political news exposure, and the political news issues selected for exposure, using multiple regression analysis.

The research was approved for human research ethics by the Human Research Committee of Khon Kaen University, Khon Kaen, Thailand on June 28, 2021, authorized under Registration Number HE 643096.

4. RESEARCH RESULTS

The results of the research herein are presented in three issues: 1) characteristics of the youths/sample group; 2) news exposure; and 3) analysis of the factors influencing political news exposure, which are detailed as follows:

4.1. Characteristics of the Sample Group

One thousand two-hundred students answered the questionnaire (100%), divided into 400 from each of the three university groups: governmental universities, private universities, and autonomous universities (33.30% each), presented in Table 3. Of the total population (1,200), 630 students (52.50%) were males and 570 (47.50%) were females. There were 454 (37.90%) studying in the fields of science and technology, followed by the fields of humanities and social sciences (398 students, 33.10%), and the health science fields (348 students, 29.00%).

4.2. News Exposure

For Internet use behavior in tracking political news, it was found that most (48.50%) used a smartphone/iPhone

Table 2. Reliability and Cronbach's alpha coefficient

Motivation for political news exposure	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
1. Importance of political news	130.27	110.96	0.526	0.814
2. Benefits of political news	130.70	119.67	0.052	0.830
3. Inner drives for follow up political news	130.23	117.63	0.329	0.822
4. Group/social network	131.53	119.78	0.003	0.836
5. Characteristics of the Internet	130.27	118.96	0.187	0.824
Motivation for political news exposure	Cronbach's alpha coefficient=0.825			

Table 3. Frequency and percentage of youth characteristics

Youth characteristics	% (Frequency)
1. University groups	
Autonomous universities	33.30 (400)
Governmental universities	33.30 (400)
Private universities	33.30 (400)
Total	100.0 (1,200)
2. Sex	
Male	52.50 (630)
Female	47.50 (570)
Total	100.0 (1,200)
3. Fields of study	
Sciences and Technologies	37.90 (454)
Humanities and Social Sciences	33.10 (398)
Health Sciences	29.00 (348)
Total	100.0 (1,200)

connected to the Internet to catch up with the news. The primary objective was for perception/cognizance of political news, at 41.40%. The percentage of youths using the Internet every day was 46.90% and the percentage of youths using the Internet for 1-3 hours a day, for the same purpose, was 69.10%. The analysis of the political news they were exposed to showed that they were mostly open to protest news/political demands, followed by news about the government's operations and the operations of the opposition parties (Mean=4.33, S.D.=0.85, Mean=4.03, S.D.=1.03 and Mean=3.79, S.D.=1.11 respectively). The analytical results of the channels for political news exposure showed that most of the youths were least exposed to political news through different channels. It was noted that the youths were open to political news at a medium level through social media such as newsfeed, clubhouse, and politics pages (Mean=3.06, S.D.=1.17, Mean=2.88, S.D.=1.42 and Mean=2.67, S.D.=0.86 respectively).

4.3. Analysis of the Factors Influencing Political News Exposure

The variable analysis was carried out using multiple regression analysis, in which the independent variables and dependent variables must be measured at interval scales or proportions only. Any variable measured at the group level would be changed to 'dummy' and the reference group determined. Within the multiple regression analysis, no pair of variables taken for analysis should correlate more than 0.75, to avoid the problem of multi-collinearity that would lessen the value of prediction (Prasitrattasin, 1995). It was found in the research that all of the variables correlated each pair lower than 0.75; therefore, the multiple regression analysis could be applied.

4.3.1. Factors Associating Internet Use Behavior to Follow-Up Political News

It was found that (1) personal characteristics, i.e., sex and time spent on the Internet to follow up on political news, correlated significantly at the statistical level of 0.01 (Table 4). The contingency coefficient level was rather low at 0.092. The field of study and the frequency of Internet use for following up on political news correlated significantly at a level of 0.05, with a relatively low contingency coefficient level at 0.101 (Table 5); and (2) the motivation for exposure to political news from the Internet and the frequency of Internet use and time spent to follow-up political news correlated significantly at the statistical level of 0.01, with low levels of contingency coefficient at 0.244 and 0.274, respectively (Table 6).

4.3.2. Factors Influencing the Channels for Political News Exposure

The four factor groups of variables were analyzed by multiple regression analysis using the Enter method. The results showed that only some independent variables influenced the channels for political news exposure. The following are details.

1) The importance of political news showed a positive influence on the channels for political news exposure, with a multiple regression coefficient (b) of 0.391. It can be explained that a one unit increase of importance of political news means a 0.391 unit of the channels for political news exposure increase. Therefore, if youth are more motivated about the importance of political news, they will receive more channels for political news.
2) Inner drives for following up on political news had a positive influence on the channels for political news exposure, with a multiple regression coefficient (b) of 0.279. This means that when a youth has one unit higher of inner drives for following up on political news, channels for political news exposure increase at 0.279 units. Therefore, if youths have more inner drive for following up political news, they will re-

Table 4. Frequency, percentage and Chi-square of youths classified by sex and behavior in using the Internet to keep up with political news

Internet use behavior for political news exposure	Sex	
	Male % (Frequency)	Female % (Frequency)
1. Tools used for tracking political news on the Internet		
Personal computer (PC)	11.10 (70)	10.00 (57)
Notebook	20.70 (130)	19.90 (113)
iPad/Tablet	18.10 (114)	23.30 (133)
Smartphone/iPhone	50.10 (316)	46.80 (267)
Total	100.00 (630)	100.00 (570)
Chi-square=3.650, df=3, Sig.=0.233		
2. Objectives for tracking political news		
Perception/cognizance of political news	42.60 (269)	40.00 (229)
Diversity of news exposure	0.60 (155)	26.90 (153)
Social utility (social interaction)	22.60 (142)	23.90 (136)
Entertainment	10.20 (64)	9.20 (52)
Total	100.00 (630)	100.00 (570)
Chi-square=2.702, df=3, Sig.=0.412		
3. Frequency of Internet use to follow-up on political news		
1-3 days/week	15.60 (98)	19.80 (113)
4-6 days/week	36.20 (228)	34.70 (198)
Everyday	48.20 (304)	45.50 (259)
Total	100.00 (630)	100.00 (570)
Chi-square=3.781, df=2, Sig.=0.151		
4. Time spent on the Internet to follow-up on political news		
1-3 hours/day	72.80 (459)	64.90 (369)
4-10 hours/day	20.50 (129)	24.60 (140)
More than 10 hours	6.70 (42)	10.50 (60)
Total	100.00 (630)	100.00 (570)
Chi-square=10.332, df=2, Sig.=0.006, Contingency coefficient=0.092		

ceive more channels for political news.

3) Influence of group/social networks showed a positive influence on the channels for political news exposure, with a multiple regression coefficient (b) of 0.062. It can be explained that a one unit increase of influence of group/social networks means a 0.062 unit of channels for political news exposure increase. Therefore, if youths are influenced by social groups/networks that have a greater effect on following political news, they will receive more channels for political news.
4) Specific characteristics of the Internet had a positive influence on the channels for political news exposure, with a multiple regression coefficient (b)

Table 5. Frequency, percentage and Chi-square of youths classified by field of study and behavior in using the Internet to track political news

Internet use behavior for political news exposure	Field of study		
	Sciences and Technologies % (Frequency)	Health Sciences % (Frequency)	Humanities and Social Sciences % (Frequency)
1. Tools used for tracking political news on the Internet			
Personal computer (PC)	13.60 (62)	9.20 (37)	8.30 (29)
Notebook	20.40 (93)	21.30 (85)	18.80 (65)
iPad/Tablet	19.80 (90)	22.00 (87)	20.10 (70)
Smartphone/iPhone	46.20 (210)	47.50 (189)	52.80 (184)
Total	100.00 (455)	100.00 (397)	100.00 (348)
Chi-square=10.854, df=3, Sig.=0.134			
2. Objectives for tracking political news			
Perception/cognizance of political news	41.60 (189)	40.20 (160)	42.20 (147)
Diversity of news exposure	24.60 (112)	26.50 (105)	26.20 (91)
Social utility (social interaction)	23.00 (105)	22.80 (91)	24.00 (84)
Entertainment	10.80 (49)	10.50 (42)	7.60 (26)
Total	100.00 (455)	100.00 (397)	100.00 (348)
Chi-square=9.961, df=3, Sig.=0.255			
3. Frequency of Internet use to follow-up political news			
1-3 days/week	16.00 (73)	20.70 (82)	16.10 (56)
4-6 days/week	36.70 (167)	38.30 (152)	30.70 (107)
Everyday	47.30 (215)	41.00 (163)	53.20 (185)
Total	100.00 (455)	100.00 (397)	100.00 (348)
Chi-square=12.260, df=4, Sig.=0.016, Contingency coefficient=0.101			
4. Time spent on the Internet to follow-up political news			
1-3 hours/day	65.10 (296)	74.30 (295)	68.30 (237)
4-10 hours/day	25.70 (117)	19.90 (79)	21.00 (73)
More than 10 hours	9.20 (42)	5.80 (23)	10.70 (37)
Total	100.00 (455)	100.00 (397)	100.00 (348)
Chi-square=11.902, df=4, Sig.=0.099			

of 0.084. It can be explained that a one unit increase of specific characteristics of the Internet means a 0.084 unit of channels for political news exposure increase. Therefore, if young people are more motivated about the characteristics of the Internet, they will receive more channels for political news.

It was found that the channels for political news exposure were mostly influenced by inner drives (Beta=0.270), followed by the importance in political news exposure (Beta=0.234), influence from groups/social networks (Beta=0.186), and specific characteristics of the Internet (Beta=0.139) at a significant level of 0.01. This could ex-

Table 6. Frequency, percentage and Chi-square of youths classified by motivation for exposure to political news from the Internet and behavior of Internet use behaviors for political news exposure

Internet use behaviors for political news exposure	Motivation for exposure to political news from the Internet				
	Very low % (Frequency)	Low % (Frequency)	Moderate % (Frequency)	More % (Frequency)	Most % (Frequency)
1. Tools used for tracking political news on the Internet					
Personal computer (PC)	20.00 (1)	2.00 (2)	0.50 (2)	1.30 (7)	1.10 (2)
Notebook	20.00 (1)	10.20 (10)	17.00 (67)	19.30 (101)	10.60 (19)
iPad/Tablet	20.00 (1)	6.10 (6)	11.20 (44)	21.00 (110)	23.90 (43)
Smartphone/iPhone	40.00 (2)	81.60 (80)	71.20 (280)	58.40 (306)	64.40 (116)
Total	100.00 (5)	100.00 (98)	100.00 (393)	100.00 (524)	100.00 (180)
Chi-square=39.623, df=10, Sig.=0.061					
2. Objectives for tracking political news					
Perception/cognizance of political news	20.00 (1)	66.30 (65)	63.90 (251)	47.10 (247)	51.10 (92)
Diversity of news exposure	40.00 (2)	20.40 (20)	20.40 (80)	28.80 (151)	20.60 (37)
Social utility (social interaction)	20.00 (1)	11.20 (11)	15.30 (60)	23.70 (124)	26.10 (47)
Entertainment	20.00 (1)	2.00 (2)	0.50 (2)	0.40 (2)	2.20 (4)
Total	100.00 (5)	100.00 (98)	100.00 (393)	100.00 (524)	100.00 (180)
Chi-square=40.114, df=10, Sig.=0.074					
3. Frequency of Internet use to follow up political news					
1-3 days/week	40.00 (2)	43.90 (43)	13.50 (53)	17.40 (91)	12.20 (22)
4-6 days/week	40.00 (2)	26.50 (26)	39.40 (155)	38.00 (199)	24.40 (44)
Everyday	20.00 (1)	29.60 (29)	47.10 (185)	44.70 (234)	63.30 (114)
Total	100.00 (5)	100.00 (98)	100.00 (393)	100.00 (524)	100.00 (180)
Chi-square=75.697, df=8, Sig.=0.000, Contingency coefficient=0.244					
4. Time spent on the Internet to follow up political news					
1-3 hours/day	80.00 (4)	91.80 (90)	79.10 (311)	65.10 (341)	45.80 (82)
4-10 hours/day	20.00 (1)	5.10 (5)	16.50 (65)	25.60 (134)	35.80 (64)
More than 10 hours	0.00 (0)	3.10 (3)	4.30 (17)	9.40 (49)	18.40 (33)
Total	100.00 (5)	100.00 (98)	100.00 (393)	100.00 (524)	100.00 (180)
Chi-square=97.219, df=8, Sig.=0.000, Contingency coefficient=0.274					

plain the variation of the channels for political news exposure at 46.5% (R^2=0.465), as shown in Table 7.

4.3.3. Factors Influencing Political News Selection

The five factor groups of variables were analyzed by multiple regression analysis using the Enter method. The results showed that only some independent variables influenced political news selection. The following are details.

1) The field of humanities and social sciences showed a positive influence on political news selection, with a multiple regression coefficient (b) of 3.395. It can be explained that youth in the field of humanities and

Table 7. Factors influencing exposure to political news: channels for political news exposure

Independent variables	b	Standard error	Beta	t	Sig.	Variance influence factor	Order of influence
Characteristics of the youths							
1. Male[a)]	-0.147	0.175	-0.018	-0.814	0.401	1.047	
2. Field of humanities and social sciences[b)]	0.030	0.108	0.006	0.282	0.778	1.061	
Motivation behind political news exposure							
3. Importance of political news	0.391	0.056	0.234	6.981	0.000	2.500	2
4. Benefits from political news	-0.028	0.050	-0.017	-0.565	0.572	2.083	
5. Inner drive for political news	0.279	0.037	0.270	7.582	0.000	2.826	1
6. Influences of groups/social networks	0.062	0.009	0.186	6.622	0.000	1.757	3
7. Specific characteristics of the Internet	0.084	0.017	0.139	5.072	0.000	1.665	4
a	4.438						
R^2=0.465, Adjusted R^2=0.462, F=148.222, Sig. of F=0.000, N=1,200							

[a)]Reference group: Female.
[b)]Reference group: Health science and technology.

social sciences are exposed more to political news selection than youth in the fields of science and technology and health science (referenced group) by 3.395 times.

2) Benefits of political news had a positive influence on political news selection, with a multiple regression coefficient (b) of 3.818. This means that when a youth has one unit higher of benefits of political news, political news selection increases at 3.818 units. Therefore, if youths are more motivated about benefits of political news, they would be more open to political news selection.
3) Inner drives for the follow-up of political news showed a negative influence on political news selection, with a multiple regression coefficient (b) of -2.565. It can be explained that when a youth has an increase of 1 unit of inner drives for the follow-up of political news, he/she would experience a 2.565 unit decrease in political news selection. Therefore, if youths have more inner drives for the follow-up of political news, they would be open to less political news selection.
4) Influence of group/social networks showed a positive influence on political news selection, with a multiple regression coefficient (b) of 2.746. It can be explained that a one unit increase of influence of group/social networks means a 2.746 unit of political news selection increase. Therefore, if youths are influenced by social groups/networks that have a greater effect on following political news, they would be more open to political news selection.
5) Specific characteristics of the Internet had a negative influence on political news selection, with a multiple regression coefficient (b) of -0.548. It can be explained that when a youth has one unit higher of specific characteristics of the Internet, political news selection decreases at 0.548 units. Therefore, if young people are more motivated about the characteristics of the Internet, they would be less open to political news selection.

It was found that political news selection was influenced mostly from groups/social networks (Beta=0.652), followed by inner drives (Beta=0.196), benefits from political news exposure (Beta=0.184), specific characteristics of the Internet (Beta=0.072), and the field of study (Beta=0.053) at the significant statistical level of 0.01. The variation of the political news selection could be explained at 44.6% (R^2=0.446), as shown in Table 8.

Table 8. Factors influencing exposure to political news: political news selection

Independent variables	b	Standard error	Beta	t	Sig.	Variance influence factor	Order of influence
Characteristics of the youths							
1. Male[a)]	3.004	2.339	0.029	1.285	0.199	1.038	
2. Field of humanities and social sciences[b)]	3.395	1.453	0.053	-2.336	0.020	1.046	5
Motivation behind political news exposure							
3. Importance of political news	1.291	0.749	0.061	1.724	0.085	2.524	
4. Benefits from political news	3.818	0.670	0.184	5.700	0.000	2.092	3
5. Inner drive for political news	-2.565	0.494	-0.196	-5.198	0.000	2.849	2
6. Influences of groups/social networks	2.746	0.124	0.652	22.118	0.000	1.743	1
7. Specific characteristics of the Internet	-0.548	0.221	-0.072	-2.485	0.013	1.664	4
a	51.000						
R^2=0.446, Adjusted R^2=0.442, F=127.970, Sig. of F=0.000, N=1,200							

[a)]Reference group: Female.
[b)]Reference group: Health science and technology.

5. DISCUSSION

The research results showed that *most of the youths were least exposed to political news through other channels, but were open to political news at a medium level through social media*. This is because it is a communication channel that promotes interaction between senders and the receivers, resulting in two-way communication. Social media has thus become an important channel for disseminating news today. One notable result of this research was that youths were moderately exposed to information via social media, which had the highest average compared to other channels. However, the news was received about protests/political demands at the highest level, reflecting that the youths did not intentionally seek political information through such channels, but were exposed to this news as a byproduct of other online activities. The diversity of news and information presented through social media's newsfeed may increase the chances of incidental exposure to political information for the audience, causing the phenomenon of 'news flows into the audience' or 'news finds me,' thus making the audience aware of various political movements and events happening in society and more alert in politics (Fletcher & Neilsen, 2018; Gil de Zúñiga et al., 2017; Muakchim, 2021; Sveningsson, 2015). It is for this reason that youths in higher education, especially in the Isan region, are increasingly active in political drives to demonstrate their political stance through various political movements such as Free Youth, Doadin Mob, and Isan Bor Yan Der (the dialect meaning "Isan youths are not afraid"). All are symbolic political expressions of Isan youths proclaiming a stand against the coup in Thailand.

This study found that sex and the time spent on the Internet to follow up on political news were directly correlated, due to their different interests in media exposure as well as time spent on media, particularly the Internet. Regarding the use of social media, females were found to use social media for educational activities at levels higher than males, resulting in female youths being more exposed to a greater amount of political news. However, in terms of political news, social practices as well as beliefs and values were obstacles to promoting woman political participation. Also, in a society where men are dominant, women have fewer educational opportunities than men, thus affecting political news exposure and political participation (Jandaeng, 2016; Mlambo & Kapingura, 2019). Today, where Thai society values men and women equally in both education and politics, women still play a less political role than men.

It was also found that the program field and the frequency of Internet use for following up on political news

also correlated, as the field of learning affects the interests and expertise of the audience. Undergraduate students studying in the Faculty of Humanities, Social Sciences, Education, and the Faculty of Business Administration use social media in their daily lives more than those in the Faculty of Agriculture, Fisheries, Forestry, Agro-Industry, and the Faculty of Veterinary Medicine. This is due to the increased level of studying required in scientific fields, providing less free time to surf the Internet. In terms of following up on political news, it was found that Humanities and Social Sciences students are connected to politics and governance. Hence, they were open to news to enhance learning and knowledge of political news more than any other field of study, exhibiting a greater frequency of exposure to political news (Jandaeng, 2016; Sarawanawong et al., 2017; Werakul, 2013). The study demonstrated that the motivation behind the exposure to political news from the Internet, the frequency in the use of the Internet, and time spent on the Internet to follow up on political news, was directly correlated due to the importance of news exposure, benefits from news exposure, inner drives, the influence of group/social networks, and specific characteristics of the Internet. The previous research dictates that each receiver is different in psychology, causing the individual to receive and interpret news in his or her unique way. The influence of group/social networks, including both close relationships and loose relationships, was determined to have different influences on a person's decisions. The primary group, which was closely related to the receivers, had a greater influence on news exposure behavior than that of the secondary group (Jintarak, 2016; Parmelee & Perkins, 2012). In addition, thanks to the advancement of Web 2.0 technology, interactive characteristics of the Internet are an important motivation for news exposure, as the communicative role has been expanded from passive receivers to active receivers (Choi, 2016). Such motivation resulted in youths spending more time keeping up with political news in terms of frequency and duration.

The results also demonstrated that *inner drives had the greatest influence on the channels for political news exposure,* because each news receiver differed psychologically, such as in attitudes and interests. Thus, the receiver selected different news channels and interpreted news differently. Inner or psychological drives can be divided into two categories: 1) interest in political news, and 2) the need for political news. As far as the need for political news was concerned, it was found that an open vision for political cognizance was the major objective of news exposure, for people wanted to be informed of news and information to expand their experiences and world vision. Interest, therefore, describes an individual's inner drive to learn about politics and is the factor that influences exposure to political news through traditional media and new media, as they correlated positively with politics, including political knowledge, political efficacy, and political participation (Brundidge, 2010; Jun, 2012; Prior, 2007). This is similar to news exposure to social media where news receivers who are interested in politics have different behavior than those who are not interested in politics. The former would be more likely to stumble upon or engage with news on social media, snacking on message clues such as headlines or illustrations. This process shows selective perception and attention and is influential in the forming of thoughts, attitudes, and knowledge of an individual related to current events in society (Sülflow et al., 2019).

Nevertheless, today's younger individuals find themselves embedded in an ambient news environment. Interest is the major factor that drives an individual to search for news from media channels. News receivers, who perceive online media as their primary news source, will pay close attention to news perceived through those channels. However, people in general perceive these platforms as social spaces in which they frequently encounter news as a by-product of social interaction, resulting in incidental exposure generally caused by members of social networks. News is shared with the audience in the network through social media newsfeeds. An algorithm depicting news media selection has been created from the usage history and reactions of receivers (Hopmann et al., 2016; Weeks & Lane, 2020). This led to the perception that low-interested or motivated individuals may become well-informed without purposely following the news—the News Finds Me Perception (NFMP). At the same time, individuals rely more on less trustworthy sources of information on social media. Strong reliance on one's communication network, however, may lead to the 'bubble filter' (Pariser, 2011) and 'information cocoon' (Sunstein, 2018), where a person becomes enclosed in the circulation of news that reflects similar political perspectives. Thus, these individuals may easily become a victim of 'fake news' and algorithms controlled by influential technological conglomerates (Boczkowski et al., 2018; Gil de Zúñiga et al., 2017, 2018).

The research found that groups/social networks were the factors with the greatest influences on political news selection. It could be explained that interactions that connect in networks influence persuading someone's thoughts and behavior related to politics more than one-way com-

 https://doi.org/10.1633/JISTaP.2022.10.2.6

munication, as it is an important property of online social networks in real-time, as they may enhance communications of politics and motivate youths' political news exposure. The greatest external influence upon individuals at the undergraduate education level are friends and social networks, as the former become more distant from their parents, the primary group that had taken the major role in forming their thoughts, attitudes, and behavior related to politics (Chansilp, 2019). News sharing among friends and social networks is therefore important for their following-up on news via their respective newsfeeds. This finding agreed with Parmelee and Perkins (2012), who studied the influences of groups/social networks on the political news exposure of an individual. Moreover, the characteristics of social contacts and the content shared by social networks influence the political news that individuals are exposed to and what they believe. Opinion leaders in the communication networks act as gatekeepers, persuading receivers and controlling the news that the receivers are exposed to, especially for individuals who are less interested in politics (Bergström & Belfrage, 2018). Online social networks, therefore, have significant political influence on news receivers. Additionally, the influence of groups or social networks *covers the people who feel they belong to the same group owing to similar political viewpoints and the people who track similar media/channels for political news.* This reflects the influence of 'communization' in political viewpoints and media exposure. Social utility determines selective exposure of social media. As a result, news sources are more important than the news issue one is exposed to, for the social network has influence in persuasion or drawing someone to view the news through different channels, especially new media (Ohme & Mothes, 2020). The results of this study thus support the concept that says *political discussions through online media are the communication among people holding similar political beliefs* (Periser, 2011; Sunstein, 2018). People with the same political viewpoint, therefore, influence a receiver's political news exposure.

6. CONCLUSION AND RECOMMENDATIONS

This study's findings indicate that most of the youths were exposed to political news through a single channel at a medium level through social media. They were mostly open to the protest news/political demands followed by the news about the government's operations and the operations of opposition parties. The channels for political news exposure were mostly influenced by inner drives, followed by their relative importance, influence from groups/social networks, and specific characteristics of the Internet. Differing slightly, political news selection was influenced mostly by groups/social networks, followed by inner drives, etc. This study, therefore, contributes to the theoretical development of related research on media exposure to political news as it provides greater comprehension of the factors influencing new media exposure of political news by youths in Isan society. Educational institutions, therefore, may form a virtual community to enhance the understanding and advancement of political news among their youthful student body. This can be in the form of classroom activities or extracurricular activities. The activities will function as a venue for creative learning and the sharing of political news issues, thereby incubating the appropriate political behavior needed for the youths to become newly informed citizens who dare to think, do, and act. Such political participation will be based on their roles and duties. This research provides an important basis for the understanding of the fundamental motivation that enhances political news exposure through new media. It will be useful for media institutions, parliament, and the Office of National Election in terms of motivating and enhancing behavior toward political news exposure. Moreover, the results will contribute to the youths' cognizance of political news for the development of a democratic society.

ACKNOWLEDGMENTS

This research was granted a research fund from the Faculty of Humanities and Social Sciences, Khon Kaen University, Khon Kaen, Thailand, Fiscal Year 2021. I wish to express my sincere gratitude to Professor Dr. Kulthida Tuamsuk for providing me with the advice and encouragement necessary to conduct my research.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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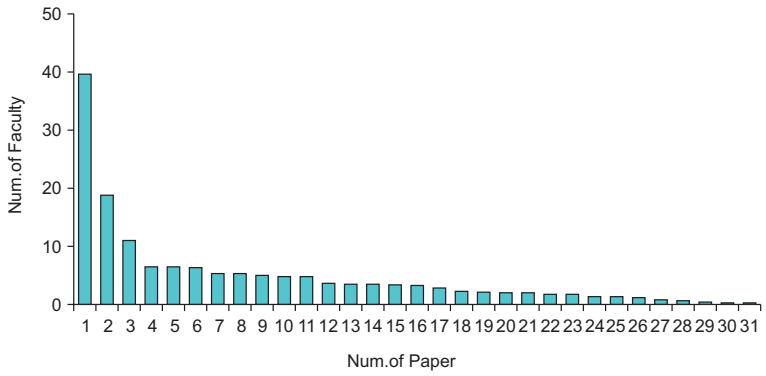

Fig. 1. Distribution of authors over publication count.

Table

Table 1. The title of table goes here

Study	Time period study	Data
Smith Wesson (1996)	1970 - 1995	684 papers in 4 SSCI journals
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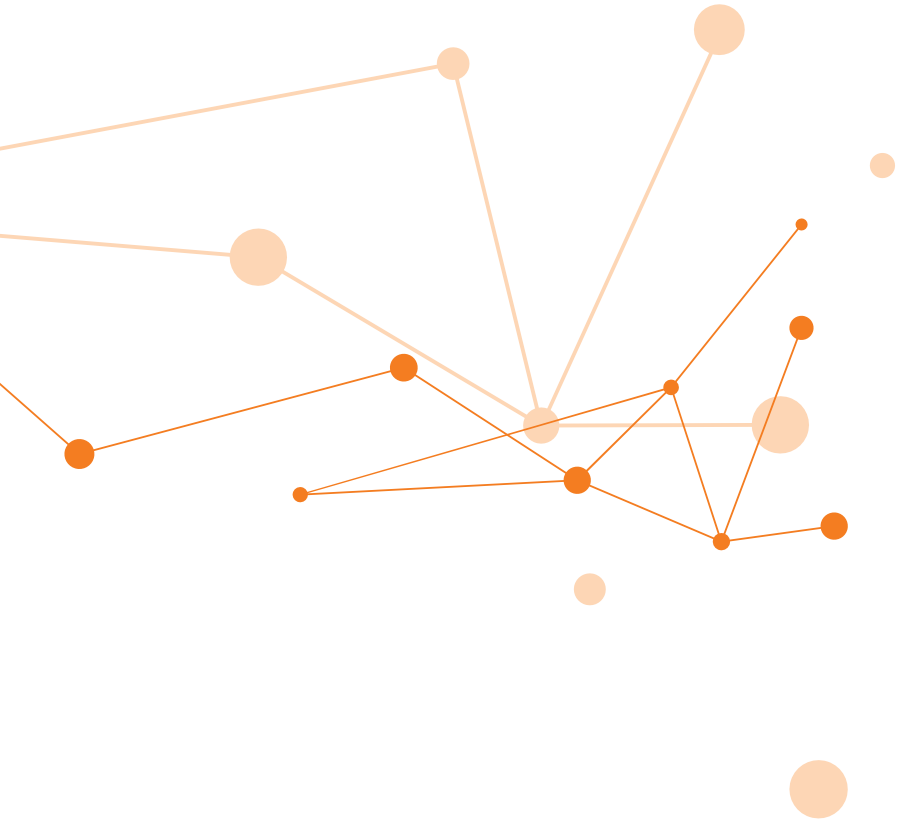

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