

Analyzing the Impact of Big Data and Artificial Intelligence on the Communications Profession: A Case Study on Public Relations (PR) Practitioners in Indonesia

N. Nurlaela Arief^{a,1}, Aurik Gustomo^{a,2}

^a School of Business and Management, Institut Teknologi Bandung, Jl. Ganesha No 10, Bandung, 40132, Indonesia
Email: ¹nnurlaela.arief@gmail.com; ²aurik@sbm-itb.ac.id

Abstract—The purpose of this paper is to explore the preparedness of Public Relations (PR) in dealing with the impact of big data and Artificial Intelligence (AI) on the communications profession in Indonesia. The research objective is to determine an understanding of AI that will have an impact on automating and simplifying PR work, to identify the competency of future PR, and to find out big data and AI can replace what kind of PR jobs. This study employed an online survey methodology with a total of 320 PR practitioners and was completed through semi-structured interviews of 10 respondents, both from State-owned enterprises and private companies. The research concludes that there are PR jobs that have been replaced by the tool development of big data and AI, among others were 45% news clippings, 45% news analyses in the media, 37% media relations, 34% content of social media management, 33% release distribution, and 24% photos and videos. This research proposes new competencies that need to be strengthened, specifically in the areas of the content creator, influencer management, social media management, and data analytics. The topic of big data and AI in the communications profession and public relations practitioners in Indonesia has never been discussed before. This has a substantial impact on the management and technology of communications and gives a broader impact on the preparedness of the industry, academia, and society.

Keywords— artificial intelligence; big data; data analytics; Indonesia; public relations; preparedness.

I. INTRODUCTION

In 2018, many universities and professional organizations and world-level public relations were served a variety of materials and discussed a critical topic concerning PR, big data, and Artificial Intelligence (AI). The World Public Relations Forum 2018 in Oslo discussed the sub-theme of intelligence issues [1] in November 2018. In Indonesia, the International Network for ANPOR (Asian Network for Public Opinion Research), in collaboration with Padjadjaran University, also led the main topics of social media, big data and AI [2]. These facts indicate that the discussion concerning this matter is prominent and has attracted significant interest from both academics and practitioners [3]. Big data and artificial intelligence have become a phenomenon for most professionals, including those in the communications profession. Previous research stated that Artificial Intelligence would extend to all concentrations. Whether or not the impact of AI will increase or decrease its influence on the Communications profession, it requires understanding and readiness of communications and PR to perceive these changes. AI in public relations for task automation gave much distinction; it requires more

widespread attention on the impact in technological, economic, and societal sectors [4].

AI would provide the user of big data the capabilities to increasingly sophisticated analytics, both predictive and descriptive, including simplifying the tasks. This function is more efficient in labor and time consumption [5]. Some of the literature and findings from previous research have different perceptions, both supporting and giving signals to be more careful [6], [7]. Most understood that PR activity depends on establishing relationships with stakeholders through personal interaction PR is a discipline that needs to maintain a reputation related to credence – humans build trust with humans, not with machines or bots [4], [8]. The moment AI sends a message, there is a possibility that public perception will be lower because it is not authentic [9], [10].

The rapid technological changes have made a variety of applications, platforms, and new tools available today to support PR and communications work [11]. This technology can simplify and automate tasks. Besides, new tools are also able to analyze complex data, and it is predicted that there will be an issue in crisis management. It is known that the engagement of influencers consistently reports on company news, and analyze whether PR campaigns are successful,

including analyzing any media that contains news about company services and products.

Communications and PR practitioners in Indonesia still need guidance in which tools are suggested to improve the quality of work. It is also urgent to provide an understanding that inside the tools there are big data and artificial intelligence technologies that can have a significant impact in supporting their work of public relations and communications. In the effort to answer some of those questions, this present study is an attempt to begin filling this gap by analyzing the impact of big data and artificial intelligence for the communications profession and public relations practitioners in Indonesia.

A. Artificial Intelligence (AI)

AI is defined as an advance and a high degree of complexity application of technology by which a machine demonstrates human cognitive function, such as learning analysis and problem solving [12]. Another definition of AI is a software or computer program equipped with the mechanism for learning. With that knowledge, it is used to make decisions in new situations, as is done by humans. AI has the ability as a machine to use algorithms to learn from data, and use what it has learned to make decisions as humans do. It is a system that can think like humans, act like humans, reason, and act rationally [13].

The impact of AI in public relations can provide positive value. In machines learning algorithms which are equipped with valid data, PR can amplify several forms of content and promotions through social media [14], also allowing the involvement between brands and audiences on social media to be improved [15]. Moreover, AI is able to provide input to the sentiment of media coverage and then send a notification when negative news appears so that PR professionals can respond rapidly.

The team of researchers from the Chartered Institute of Public Relations revealed that although humans could think critically, some PR activities are threatened because AI can replace them [16]. Thus, PR practitioners should strengthen their skills in areas such as basic research, content development, program evaluation, and management of issues and crises. PR also requires creativity, which is a way of thinking that a machine cannot replace [17].

AI's unique ability is to provide an in-depth study in which the most interesting about AI is not its ability to imitate human intelligence, but its ability to see the world differently from a human's perspective [18] [19]. Therefore, the AI can process and identify patterns in big data volumes that seem different and will help the organization to act on potential risks and communication crises that may affect reputation.

With the technology of big data and AI, PR professionals cannot only understand information that has arisen but also predict an event that may occur in the future. Some of the literature and findings from previous research have different perceptions, both supporting and giving signals to be more careful. Most understood that PR activity depends on establishing relationships with stakeholders through "personal interaction." This relationship will certainly not be obtained through AI.

B. Big Data

AI and big data cannot be separated because AI needs big data to become smarter. The world's data shows that each year the data is manifold. Currently, the human population in the world is around 7 billion people, and more than 5.1 billion use cell phones. Every day human beings on this earth send more than 11 billion texts and watch more than 2.8 billion YouTube videos. Another definition of big data is the characterization of information and data assets in high volume, velocity, and variety to involve the specific technology and analytical methods for its transformation into value [20].

Some definitions clarify that big data is divided into 4V, volume, variety, velocity, and veracity. The volume aims to describe the characteristics of data size, whether small or big. The variety is subject to relate the characteristics of the information based on structured and unstructured data. The velocity function to describe the characteristics of the information from how fast data is generated. Veracity is for explaining the characteristics of the information based on how important the data is [13], [21].

Big data has innovations that allow new tools and procedures to be utilized not only by researchers but also by practitioners. With these capabilities, it can analyze essential data and contribute to providing solutions to complex and challenging problems [22]. Big data analytics plays a critical role in predicting future probabilities with an acceptable level of reliability to support the acceleration of decision making.

C. Indonesia Public Relations Practitioners

This research focuses on the case study of public relations (PR) practitioners in Indonesia. Currently, there are two Indonesian PR associations with the most significant members, PERHUMAS and FHBUMN. PERHUMAS is a professional organization of Indonesian Public Relations and Communication practitioners that was founded on December 15, 1972. The organization aims to improve professional skills, expand, and deepen knowledge, increase relations, and exchange experience between members as well as connect with organizations on national and global scales.

The headquarters of the management board is in Jakarta, with branches almost throughout all the cities of Indonesia. PERHUMAS is also affiliated with the global alliance for public relations and communications management (Global Alliance). FHBUMN is a Public Relations Forum of State-Owned Enterprise (SOE), with members of PR from 140 SOEs in Indonesia. The FHBUMN has an objective to support the competent and highly dedicated Public Relations professionals in the State-Owned Enterprises. A forum was established for communication, coordination, and consultation to improve abilities and professionalism. This organization is responsible for managing communications and information, while responsibility is related to the needs of the community concerning the State-Owned Enterprises themselves.

II. MATERIALS AND METHOD

A. Data Collection

The process of data collection was conducted from April 2018 to June 2019 using the primary online survey method and semi-structured interviews. The surveys were distributed through PR-related email lists and social media groups of Indonesian public relations practitioners of PERHUMAS Indonesia and FHBUMN.

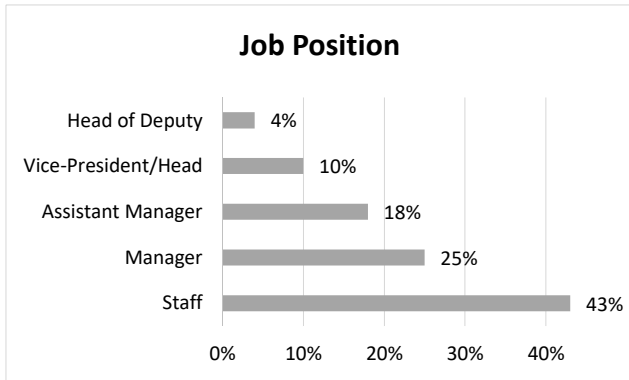


Fig. 1 Job positions

The PR sample encompasses 320 respondents. The respondents were 49% male and 51% female. The sample included in the analyses encompassed 4% heads of deputy, 10% senior communications professionals in the organization (vice president), 18% assistant managers, 25% in the middle management level, and 43% who indicated that they had operational or staff and supervisor of communications management responsibilities as shown in Fig.1.

In Fig 2, the PR practitioners sample encompasses respondents from various industry sectors. 43% from state-owned enterprises, 23% from private companies, 12% PR in University, 10% health PR, 4% government PR, and 4% PR that work in media.

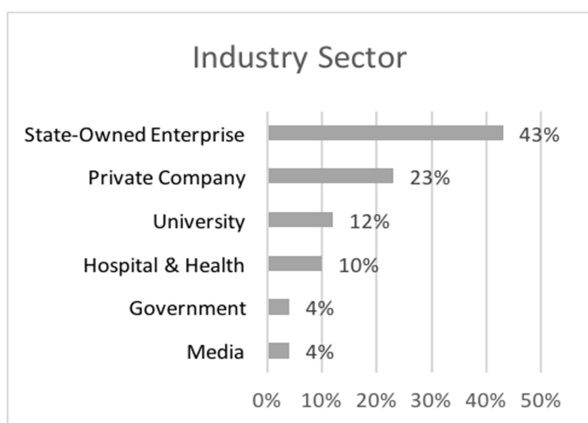


Fig. 2 Industry Sectors

B. Semi-structured Interviews

After the data was collected, interviews were conducted to discover new competencies that are needed by public relations and to analyze the impact of big data and artificial intelligence on the communications profession for the next 5 to 10 years, the interviewees as listed in Table I.

To complete and confirm the data, semi-structured interviews were carried out either directly or by sending the questions via email. The interview involved 10 (ten) communications and PR practitioners at the level of Vice President-Head and Manager, and through interviews with Doctoral Degree program students of Information Technology, Big Data practitioners, Information Technology employees at *BUMN* (State-owned Enterprise) and Information Technology (IT) practitioners from startup companies.

TABLE I
LIST OF INTERVIEWEES

Qualifications of Participants	Number	Sectors
Vice President of Corporate Communication	2	State-Owned Enterprise
Head of Corporate Communication	1	State-Owned Enterprise
Head of Corporate Communication	2	Private Company
Social Media Manager	2	State-Owned Enterprise
IT Student	1	University
IT Startup Company	1	Private Company
IT Manager	1	State-Owned Enterprise

C. Validity and Reliability Data

The literature studies are based on references from various international journals; the latest research in the last five years, as well as new books related to AI, which were published in 2018 and 2019. Later, a peer-group of fellow researchers and an IT team checked the interviews and discussed the accuracy of the data results. Discussions and observations were conducted using triangulation methods for data validity and reliability for a qualitative method.

D. Research Analysis

The research questions posed to determine the understanding of AI to automate and simplify PR work. What competency of future PR will need to prepare for, find out what kind of PR jobs can be replaced by big data technology and AI. Then, it determines whether the human aspect is still needed in public relations jobs in Indonesia as shown in Figure 3.

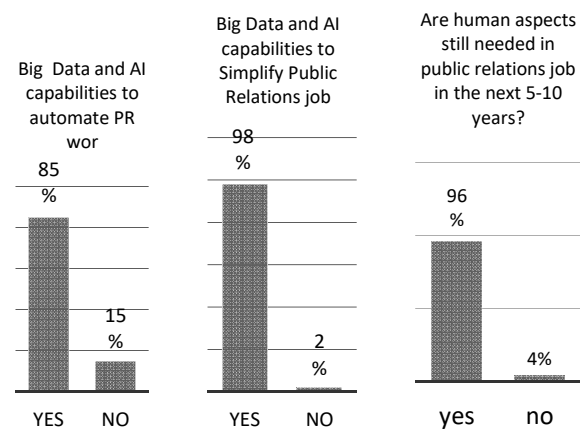


Fig. 3 The research results

Fig. 3 shows the research results, which concluded 85% of respondents agree that the use of big data and AI could automate public relations and communications jobs. 15% stated that they did not agree that big data and AI have the capability to automate PR work. In response to the question of whether big data and AI can simplify the work of public relations and the profession of communications, 98% of respondents agreed, and only 2% did not. For the question of whether human aspects will still be relevant and needed in PR jobs for the next five to ten years, 96% agreed and believe that humans will always be necessary. Only 4% of the respondents had the opinion that AI will replace humans.

III. RESULTS AND DISCUSSION

A. Search Results

This research analyzed the PR job being potentially replaced by the development of big data and AI technology as shown in fig.4.

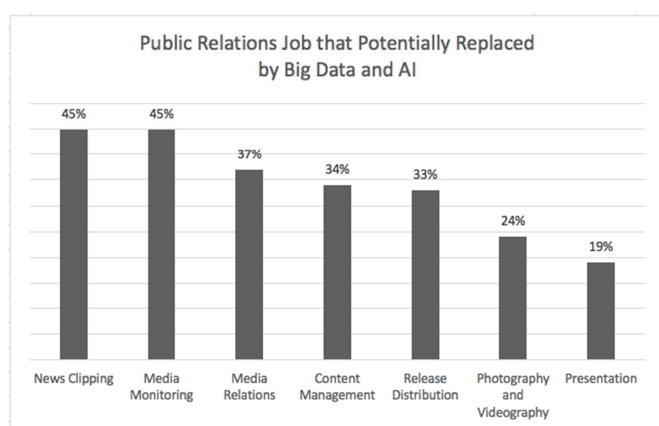


Fig. 4 The research results

A detailed explanation of this study is presented in Table II below.

TABLE II
DESCRIPTION OF PR JOBS BASED ON QUESTIONNAIRES AND INTERVIEWS

PR Jobs	Description
Quantitative	
News Clippings	45% responded that the job that had the potential to be replaced is news clippings. With the development of big data and AI monitoring printed media, online and social media were considered to have replaced the manual job of collecting news clippings.
Media Monitoring	45% of respondents agreed that media monitoring in the context of social listening is the second-ranked job that will be replaced by big data technology and AI. The most basic analysis of media monitoring is to categorize information that has a positive/neutral/ negative impact and provide insight for the company.
Media Relationship	37% of the respondents stated that the frequency of media relations and stakeholder interactions in the context of face to face meetings would be decreased. These activities would be replaced by communication channeling, social media, tools, or platform in line with various technologies that

	can replace direct relations through new technological tools.
Content Management	34% of the respondents answered that several applications, platforms, and tools could manage the content and have the ability to automate the content that will be published on social media.
Release Distribution	33% of respondents thought that news release distribution could be optimized with new tools, namely wires. These wires offer distribution of releases to reach the media outlet.
Photography and Videography	The activity of photography and videography is a job that is still the domain of humans. 24% of respondents agreed that photos and videos were considered an aspect where human expertise was needed.
Presentation - Face to Face Communication	PR work is related to direct communication (face-to-face), such as in presentations, and this job is less likely to be replaced by big data technology and AI. Only 9% responded that AI or big data tools would replace presentation skills and face to face communication.
PR Jobs	Description
Qualitative	
News Clippings	<i>"This activity is not entirely replaced; however, the execution is transferred to a third party, due to the reasons for efficiency and rapidity, buying the services of media monitoring analysis from an IT company. News clippings in the media are to monitor the conversation, that mentions the company or company's products/services traditionally. The growth of online media and less printed media that has emerged has made the clipping work hardly done manually."</i> — Vice President of Corporate Communications, a private company.
Media Monitoring	<i>"Every morning, we accept the result of media monitoring. Sometimes in risk and crisis conditions, we will use the tools of listening and media monitoring analysis to give feedback and notifications two or three times a day. After dividing them into positive, negative, or neutral sentiments, the categories will be based on the results which will be analyzed. Media monitoring and social listening have the abilities and can support the companies to listen more to where industry and business conversations are among the audience's perceptions. The results or insight is crucial as input for the management to make predictions and considerations"</i> — VP of Corporate Communications from a State-Owned Enterprise.
Media Relationship	<i>"At present, the dissemination of media release is more efficient, simply by spreading through the corporate-owned media such as a website, media dashboard, Twitter, Instagram, YouTube, and Facebook. The WhatsApp group messaging application is also quite effective as a channel of preference for distributing releases, both news, photos, or videos."</i> — PR Manager of a State-Owned Enterprise.
Content Management	<i>"Now, our team uses tools for managing the content on social media, a lot of graphic design tools that are user-friendly, starting from designing, sharing, creating content for social media and PR campaigns. These tools also provide access to a variety of photos and graphics. Besides this, numerous applications</i>

	<i>are available for making videos, combining photos and producing audio that is quite representative for content” —Social Media Manager of a state-owned enterprise).</i>
Release Distribution	<i>"In distributing press releases, there are various network services or news wires that can help distribute releases to various target audiences, both domestically and abroad. Previously we sent releases through the news agency for distribution to various countries. We have now started using news wires that are affordable enough to spread releases to destination countries in places such as Africa, the Middle East, and Europe”, — Head of Corporate Communications from a state-owned Enterprise.</i>
Photography and Videography	<i>"Applications such as go animate, Vyond, Animoto are tools that can improve the quality of the photos and videos. Also, there are various applications, such as free pic or photo stock. However, on the special events and important ceremonies, the photographer is a must. This requires human expertise in selecting and capturing important and relevant moments." — Social Media Manager, State-owned Enterprise.</i>
Presentation - Face to Face Communication	<i>"Currently, in supporting the presentation, there is an application that integrates presentation content; therefore, it becomes more attractive and entertaining. We use the Moovly application, which improves the quality of presentations by adding animated objects, sounds, and music. Regardless of the availability of tools and applications, human roles remain the primary" — Vice-President of Corporate communications, State-Owned Enterprise.</i>

B. Competencies

Previous research has conducted a study of the importance of preparing competencies and capabilities in the communications profession for all sectors so that practitioners can prepare themselves for more consistent knowledge, skills, and abilities (KSA). Also, several studies to date have linked KSA, competency, and practitioners' ability for key public relations activities and communications management that are needed for the future. [16]. In line with that, based on the research, Indonesian Public Relations propose four new competencies that are relevant to the industry today and the future:

1) *Data Analytics*: The ability to carry out analysis with various methods, applying the techniques of analysis, measurement, statistics, evaluation, and preparing reports to give some input in decision-making, trust, and reputation[18]. Artificial intelligence, especially big data, has innovations that allow new tools and procedures to be utilized not only by researchers but also by practitioners. With these capabilities, it can analyze essential data and contribute to providing solutions to complex and challenging problems. AI technology can be implemented in applications to collect data, share data, and data analytics. Processing of data parallelly based on big learning has a high possibility of increasing the final results of predictions.

2) *Social Media Management*: The high number of media users in Indonesia, only limited to sending messages

in one direction, is contrary to the PR Excellence Theory of Grunig and Dialogue Theory of Kent & Taylor, that the function of the content of social media should be done from both directions. Competency is needed to manage social media with a more integrated strategy. Current social media has two-way communication, such as giving a sign of “like” and comment on the content posted by a follower. Competency also needs to plan the content that is managed through social media. Previous research has stated that social media analytics tools are very useful in generating data quickly in real-time, as well as being able to analyze so that the audiences understand how an issue develops in public according to their perceptions [22].

3) *Influencer*: An influencer is advertising or endorsement by a third party that can configure the attitude of the audience. Influencers gain popularity through active participation on various social media platforms and the entire network, like YouTube, Facebook, and Instagram[23]. Currently, there is a tool to identify the characteristics of a specific influencer who is most attractive to the audience who can show intelligence, ambition, and is inspiring[24]. A positive influencer is one who carries out posting activities with a specific frequency, involves the audience, and has a reference that shows how credible he or she is as an influencer. Influencers are people who have influence and are followed by many people on the internet. Their opinions are used as a benchmark to understand the industry they are in. Influencers can be bloggers, vloggers, journalists, academics, professionals, celebrities, or ordinary social media users who have a certain number of followers [25]. Based on the interview, some State-owned Enterprises in Indonesia are now preparing millennial employees to increase their skills in managing internal influencers to support corporate communications teams and to strengthen social media campaigns.

4) *Content Creator*: According to data from LinkedIn [24], the number of recruited PR profession and journalists decreased in the past five years to only about 15% and has been replaced by the positions of social media professionals and content creators that have reached over 30%. The content creator is a profession in which someone is competent to create content in the form of writing, images, videos, voice, or a combination in all content. This competency encourages the ability to utilize various media platforms with content that is expected to be liked and desired by the audience.

IV. CONCLUSION

The results of previous research and the study in Indonesia reached almost the same conclusion: with the technology of big data and artificial intelligence that will revolutionize the world of communication and public relations, the human aspect is still needed. AI can indeed replace some PR activities; however, with the advance of new tools and platforms, public relations practitioners are encouraged to learn and trial new tools as needed.

The future of the PR profession that focuses on the human aspect will still be needed in 5 years or even in the next ten years. Moreover, public relations practitioners need to improve their abilities and practices using various tools with

AI and big data to simplify the PR activities. The tools available for automating different content and managing social media can be more optimally utilized. Besides this, the ethical, legal, professional, and personal aspects are the underlying philosophies that are important for the future of public relations. For this reason, integrity as a PR professional is the key to sustainable communications by maintaining and minimizing aspects of reputation risk caused by therapeutic activities, issues of copyright, and privacy.

In the future, with the presence of new tools, the new role of human beings in the world of public relations can make them prepare to rethink organizationally and make internal guidelines to understand what is happening now with the implications of big data and artificial intelligence. Besides, standard operating procedures regarding the person in charge of all the results that have been made by implementing a new PR tool should be decided.

All activities should be well documented and structured, and the digitalization processes must also be coordinated with cross-functional units in the company, both from information technology and other functions that deal with this. The application of this new PR also needs to be socialized more massively to all communications stakeholders. Material adjustments are required in teaching and must be adapted to the trends and also be relevant to the industry. This revolutionary change, of course, positively affects the development of the public relations theory and the new model of public relations, economic, social, and cultural characteristics. However, further discussions of the various groups involving academia, government, and practitioners to determine this finding is a must.

There are various polarized views about the future of PR and the importance of PR. What was discovered in the survey certainly cannot ultimately reveal the future of the PR profession is. Moreover, with the cultural, communication models, and values of Public Relations practitioner's activities in Indonesia, this gives hope and confidence that PR will never really die. The role of new PR that can survive is the one that can utilize and optimize technology with its personal touch, while at the same time demonstrate a strategic and creative role.

ACKNOWLEDGMENT

Research on the analysis of the impact of big data and AI technology is part of the research that has been described in detail in a presentation to Indonesian State-owned Enterprise Public Relations Congress by the author. This research does not receive funding from any party and has no conflict of interest. The researchers thank the Indonesian Public Relations Association FHBUMN and PERHUMAS for their ease and access when distributing surveys to and interviewing as well as for supporting the respondents to take part in this research.

REFERENCES

[1] Global Alliances (2018), Retrieved from <https://www.worldprforum.com/WorldPublicRelations>.

[2] ANPOR, "Developments Of Media And Public Opinion In Asia" Politics, Big Data and Social Media," 2018. [Online]. Available: <https://www.anpor.net/2018-anpor-annual-conference/>.

[3] U. Sivarajah, M. M. Kamal, Z. Irani, and V. Weerakkody, "Critical analysis of Big Data challenges and analytical methods," *J. Bus. Res.*, 2016.

[4] Galloway, C, Swiatex, L "Public Relations and artificial intelligence:It's not (just) about robots", *Public Relations Review*, Volume 44, Issues 5. 2018.

[5] M. Hussain, "Artificial Intelligence For Big Data: Potential and Relevance" *Journal of Business Research*, vol. 70, Pages 263-286, Jan. 2017.

[6] Gourley, S. (2018). This is how AI can help you make sense of the world" Agenda. World Economic Forum. Retrieved from: <https://www.weforum.org/agenda/2018/06/this-is-how-ai-can-help-you-make-sense-of-the-world>.

[7] Global Alliance (for Public Relations and Communication Management (2018). A global capabilities framework for the public relations and communication management profession. Lugano, Switzerland Retrieved from <https://www.globalalliancepr.org/capabilitiesframeworks>.

[8] Grunig, L, Grunig, J., & Dozier, D. (2002). Excellent organizations and effective organizations: a study of communication management in three countries. Mahwah, NJ: Lawrence Erlbaum.

[9] CIPR (Chartered Institute of Public Relations) (2015). State of the profession 2015 Retrieved from <https://www.cipr.co.uk/content/policy-resource/research/our-research-and-reports/cipr-state-profession-2015>.

[10] A. Scott, "How Artificial Intelligence and Intergenerational Diversity Are Creating Anxiety in The Workplace _ Institute for Public Relations," Institut for Public Relations, 2018. [Online]. Available: <https://instituteforpr.org/how-artificial-intelligence-and-intergenerational-diversity-is-creating-anxiety-in-the-workplace/>.

[11] I. Ristic, "PR in 2018_ Dominated by technology, mired by inauthenticity _ PR Week," 2018. [Online]. Available: <https://www.prweek.com/article/1453426/pr-2018-dominated-technology-mired-inauthenticity>.

[12] J. Valin, "Humans still needed: An Analysis of skills and tools in Public Relations," Chartered Institute of Public Relations, 2018.

[13] L. Rouhinen, Artificial Intelligence, 101 things you must know today about our future, 14 November. USA: Amazon Books, 2018.

[14] Lynch, C. (2018). How PR pros should prepare for artificial intelligence. Ragan's PR daily. Retrieved from <https://www.prdaily.com/Main/Articles/482543a6-4e1f-4111-af8b-9e46019028cc.aspx>.

[15] R. A. Laoui Djafri, Djamel Ammar Bensabeur, "Big data analytics for prediction: parallel processing of the big learning base with the possibility of improving the final result of the prediction.," *Inf. Discov. Deliv.*, 2018.

[16] J. Macnamara and T. Sydney, "Competence, competencies or capabilities for public communication ? A public sector study," vol. 19, pp. 16-40, 2018.

[17] CIPR (Chartered Institute of Public Relations) (2017). Retrieved from https://www.cipr.co.uk/sites/default/files/10911_State of PR 2017_f1.pdf.

[18] H. D. Harlow and H. D. Harlow, "capital Developing a knowledge management strategy for data analytics and intellectual capital," 2018.

[19] Y. Ma, K. Ping, C. Wu, and L. Chen, "Artificial Intelligence-powered Internet of Things and smart public service," 2019.

[20] A.Laksono, "Workshop Big Data and Artificial Intelligence by Telkom Big Data Scientist," Semarang-East Java, Indonesia, 2018.

[21] N.N. Arief, PR in the era of Artificial Intelligence, Simbiosis Rekatama Media, Bandung, 2018.

[22] C. Hsiu-chin, C. Roger, and S, Veda, "Business Intelligence and Analytics: From Big Data to Big Impact" *MIS Quarterly*. vol. 36, pp. 1165-1188, 2012.

[23] R. Molla, "Linkedin_Chart_ How the definition of 'journalist' is changing - Vox." 2019.

[24] Adweek, (2018, 18 Juni). Unilever to Crack Down on Influencers Who Buy Fake Followers and Use Bots, retrieved from <https://www.adweek.com/brand-marketing/unilever-to-crack-down-on-influencers-who-buy-fake-followers-and-use-bots/>

[25] F. L. Freberg K, Graham K, McGaughey K, "Who are the social media influencers? A study of public perceptions," *Public Relat. Rev.*, vol. 37, no. 1, pp. 90-92, 2011