

Mass Media in Bangladesh: Industry 4.0 Perspective

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Abstract

Industry 4.0 is the blessings of the advancement of digital technologies like IoT, AI, robotics etc. In manufacturing entities, automation poses Industry 4.0 forefront all over the globe. In media industry, news, views, opinions, advertisements, drama, cinema and different genres' productions have been producing every day. In the productions, some digital technologies which are aligned with Industry 4.0 have been using. The study has analyzed the existing situation and challenges of mass media sector in Bangladesh and remedies in the perspective of Industry 4.0. AI, IoT, robotics etc. have used in limited scope in media houses. Moreover, data journalism, content marketing, blog, digital contents through social media, search engine optimization etc. also been operating in media sectors in Bangladesh. Still there are some challenges like transformation of digitalization, lack of motivation, aligned media curriculum at university level, investment, reluctant to adopt new innovation etc. Therefore, some steps are needed to be taken to maximize the benefits of Industry 4.0. Skilled and capable manpower, Industry 4.0 aligned media and journalism curriculum, adequate investment and infrastructure etc. should be considered as remedies.

Key words: Mass Media, Industry 4.0, Artificial Intelligence (AI), Data Journalism, Social Media

Introduction

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The Fourth Industrial Revolution (4IR), popularly known as Industry 4.0 is now a reality for the society. It was originated from a report published by the German government as a form of technological strategy in 2020 (Zhou et al., 2015). Industry 4.0 is about whole automation of manufacturing entities around the globe. It has reshaped the businesses organization in production and distribution chains. The internet of things (IoT), cloud computing, analytics, artificial intelligence (AI), and machine-learning (ML) are the dominant technologies which manufacturers have incorporated into their manufacturing processes. Industry 4.0 includes some other computer aided tools like advanced sensors, embedded software, and robots that gather and analyze data help with decision-making by the manufacturers (Javaid et al., 2023). It has a great influence from the process of human communication of face to face to virtual. Now the human communication process is matched in cyber-physical system which means what the communication is existed in physical world and it is frequently transformed and existed in cyber space as well. So, the content production system has transformed into smart and technology driven. The media industry around the globe has adopted information and communication technologies (ICTs) massively through which media productions are being automated and digitized. As a developing country like Bangladesh where media industry has not been grown up as global standard, but the huge number of mass media consumers are considered as potential for the industry as a whole. But in regard to investment in media industry is not huge in the global context. The digitization is a must for the media industry since Industry 4.0 is a reality. Some digital technologies have been adopted in mass media sector of Bangladesh, but still lacks and challenges have been prevailing align with industry 4.0. The study has dealt the existing situation and its challenges and identified the further needs to cope up with the situation through literature survey approach.

4IR and Mass Media in Bangladesh

Industry 4.0 is fully dominated by digital technology. It turns the regular industry into smart industry using advanced technology like AI, robots, clouds, machine-learning etc. Therefore, the production could be huge with minimum cost. It directly reduces the human work-force. Since Industry 4.0 mechanizes and boosts productivity but it also pushes people out of work, lowered wages and finally all the gains would divert to the business owners (Allen, 2018). In the progress of Industry 4.0, robots would threaten work, wages and equality. Findings of a study indicate that 47% of American jobs are at a high risk of being automated (Frey and Osborne, 2017). Though the developing country like Bangladesh has not fully introduced Industry 4.0, but in the near future significant influence would be visible. The mass media industry in Bangladesh has two workplaces viz. inhouse and outside where labors are engaged. In reporting, coverage of different programs requires huge labor. Simultaneously indoor and outdoor activities demand various technologies to produce quality productions. Once the press of Bangladesh used linotype typesetting. The first

major technological breakthrough took place in the press industry of Bangladesh when computer technology has become popular in late 1980s (Chowdhury and Murshed, 2020). In linotype era, for example, at least four typesetters were needed to compose an eight-column newspaper page and as many as 32 typesetters were needed for a standard eight-page newspaper. The mechanically skilled typesetters were started to lose their relevance in the industry because of digital skills of computer savvy young workers replaced them (Ahmed et al., 2020).

So, the technology is considered as mandatory and Industry 4.0 is also a reality. In this context the media industry does not avoid or bypass it. In the meantime, DSNG (digital satellite news gathering) has turned into mobile internet news gathering system and AI, ChatGPT, digital camera, visual effects (VFX), latest software for editing and operating system etc. have been using in the media industry. The country first AI news presenter 'APARAJITA' introduced by Channel 24 on 19 July 2023 (*The Business Standard*, 2023). At the eve of Industry 4.0, AI-generated journalism just started to evolve which sparks both the excitement and ethical issues in newsrooms. AI-technologies offer unprecedented efficacy and cost saving in media industry. But there still exist some debates on decreasing of human work-force and accuracy of content. Its impact on media landscape which would be an interesting and concerning matter for the industry (Choudhury, T. S., 2023). This convergent relationship of mass media in Bangladesh and Industry 4.0 is important to investigate for taking further measures. The investigation can be systematically done on the basis of the following research question:

R.Q: In the convergent relationship viewpoint, what are the situation and challenges of Bangladesh mass media in Industry 4.0 context and how would the challenges be overcome?

Literature Review

In a study, using the literature review method, Amran et al. (2023) mentioned that the form of technology adoption is the process of computational journalism as a production action based on smart factory. News automation is a production function and a Cyber-Physical System (CPS) based news distribution. Mentioning CPS system, developed in the form of IoT, IoS and intelligence factories gives every content physically represented in cyberspace and vice versa in the real world. In future, use of technology by human would be turned into machines, just like the automation of contents carried out by the news media (Roblek et al., 2016). Sirait (2022) opined the news industry uses artificial intelligence in news dissemination like news presenter, referred to Industry 4.0 where digitization and automation of the combination of internet and manufacturing is worked out. This automation and digitization in mass media has led to the programming of algorithms on editorial desk especially for the journalist workflow in producing news and the algorithmic processes turn data into narratives, interpretation, description without any human intervention (Latar, 2018). It is assumed that in the age of automation and digitization in Industry

4.0, a new form of socialized communication, namely mass communication in large numbers would be emerged which uses computer networks in a digital set-up of globally distributed and interactive. This new form media doesn't determine the contents and effects of messages conveyed but it allows unlimited diversity and global production (Castells, 2007). Nandini et al. (2024) explored the AI and its usages in the journalism and media industry. The study findings indicate that if AI can be used correctly, it can make a big change in the media sector, but now-a-days it affects journalism negatively because of faulty use of algorithms, deep fake and fake contents availability. So, challenges and opportunities have faced while using the tools and technologies. Industry 4.0 undoubtedly influences on mass media industry which has introduced different terms relating to the working of robots in the newsroom. These are just like as open data journalism, big data journalism, blockchain journalism, cloud journalism etc. (Hasan and Albayari, 2022). A survey of 71 media organizations from 32 countries explores that AI can help fight economic challenges and simultaneously strengthen misinformation and disinformation too (Beckett, 2019). UNESCO (2019) also highlighted digital divides, misinformation and media professionals' deficiency of technological skills as challenges.

In Bangladesh context, a few studies have found in this comparatively newer sector. Khan and Shnaider (2021) deliberated the automation of typical journalistic tools to permit journalists to quickly distribute news and receive audience comments, and pass feedback accordingly. They also opined that particularly in the field of digital journalism, automation has resulted in the creation of thousands of new employments for aspiring journalists. In a study, Goni and Tabassum (2020) discovered that Bangladeshi students, who have enrolled in journalism and media discipline at several institutions to pursue a career in journalism, are mentally prepared to understand and accept AI as a revolutionary technology with limitless personal and professional benefits.

Rahman (2020) mentioned that the country has progressed with the technologies of Industry 4.0 principles like automation, AI and data-driven communication. To cope with Industry 4.0, scholars note that the traditional media outlets such as newspaper, radio, television have been notably converging with digital platforms (Karim & Haque, 2018). Islam and Anam (2021) found that existing journalist practices and newsroom management has been reshaping due to algorithmic content distribution and mobile journalism. Amid of Industry 4.0, media industry is real under pressure to adopt smart technology maintaining ethical standards (Rahman and Hossain, 2022).

The existing studies have addressed insufficiently the skills and training needs of media professionals in technology adaptation, ethical implications of algorithmic bias and misinformation, effectiveness of current media policies under industry 4.0. These gaps indicate the need for context-specific study on the whole status, challenges and coping mechanism of media organizations in Bangladesh from Industry 4.0 perspective. The study has been taken to fill these gaps.

Theoretical Perspective

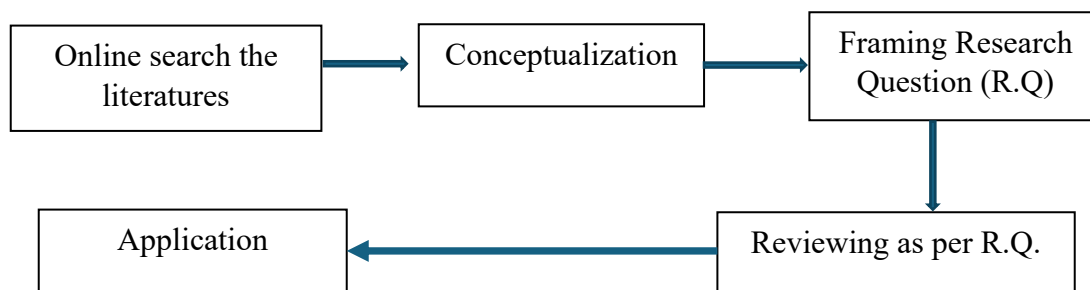
‘Technological Determinism’ (McLuhan, 1964), ‘the Media Ecology’ (McLuhan, 1962) and ‘the Post-humanism Approach’ (Foucault, 1970) are the theoretical base for the study where digital technologies of Industry 4.0 and its interventions have been reshaping media production chains, journalistic practices, ethics, working environment, culture, communication, perception, thinking, human behavior etc. At the end, human is not only factor in the society, but technology, machine have been creating a new environment, society and even humanity. These three theories help understand the media landscape of Bangladesh in Industry 4.0 perspective.

Objectives

Considering the context of Industry 4.0, the study aimed to analyze the existing situation and challenges of mass media in Bangladesh. It also suggested some coping strategies for upcoming full-flagged Industry 4.0 interventions in the media sector of Bangladesh. More specifically, the study was to a) analyze the status of media industry amid Industry 4.0; b) identify challenges; and c) find further needs.

Methods

The study has applied a qualitative approach using the secondary sources of data. In writing this article, a literature survey was followed. The reasons of adoption of qualitative method are to gain deeper understanding and interpretation of rich available data, analyze existing detailed data relating media and Industry 4.0 and examine the research question set for the study. The steps followed as such available literatures search in online first, then consider only relevant papers, after that reviewed duly and defining of research questions and finally evaluation and analyses the text through presenting results and discussion. The steps for writing are adapted from the framework of a scientific article titled A Complex View of Industry 4.0 (Roblek et al., 2016). Researcher’s own analytical thinking is engaged to draw inferences as well. The flowchart is as follows:



(Source: Roblek et al., 2016)

Though the study has followed the scientific way of review and analysis, but bypassing quantitative approach, in-depth interview could be considered as limitations of the study.

Results and Discussions

Where we are

Using AI: Mass media industry in Bangladesh has been using AI technology in some ways. Channel 24 has introduced AI guided news anchor. The journalists use social media like Facebook recommended news. They also use AI for checking the facts. Some popular fact-checking organizations like Dismislab, FactWatch, Rumor Scanner etc. have been established in our country that use AI technology for fact checking. They also use online chatbots and receive online purchasing recommendations from AI. AI is also used as supporting technology for data collection, distribution and audience interaction in mass media industry in Bangladesh not in a large scale. For instance, some of the online news-portals like Jago News, Dhaka Post.com etc. have been using AI to interact with their readers. When a reader expresses their wish to come across specific news or beat-based new, then AI-run chatbot sends them instant replies and shares their desired news link (Partha et al., 2024). These intertwined and wider uses of digital technology in media organizations indicate the post-humanism approach where skills, capacity, knowledge etc. are produced with the interactions with human and technologies (Foucault, 1970, Haraway, 1985).

Data Journalism: In order to survive in Industry 4.0 or digital age, new journalistic arenas like data journalism or digital journalism might have to embrace in Bangladeshi newsrooms. It has been replacing the traditional duties of media and journalists (Faruk, 2023). Media houses are producing reports based on filtering and analysis of large data sets. Data journalism as a new form has already made an impact on public discourses in Bangladesh since this practice has been increasing by the dominant media houses. Using different data sets, journalists are producing diverse reports, visuals which create a new media environment of receiving data, perception on news and thinking of audiences. This transformation aligns with Media Ecology Theory (McLuhan, 1962 & Postman, 1985).

Online Journalism: In today's digital era, online journalism is one of the trends of media industry. It is internet-based process of collecting, writing, editing and disseminating news online. Online journalism is a new generation of journalism after conventional and broadcast journalism (Hutomo, 2020). It is one kind of journalism that utilizes the internet and other digital technologies as a means of broadcasting news so that it can sustainably be accessed throughout the world. In Bangladesh, online journalism is started strongly. A huge number of online news-portals have been registered and published. This form of journalism has already gained wide acceptances by the audience. People are now being accustomed with online version of new media and online media have changed audience habit of information consumption, engagement with news contents, access and interpreting news. It very much aligns with Media Determinism Theory (McLuhan, 1964).

Every media will turn into digital form in the near future where Industry 4.0 technologies would play as catalysts and skills are required to cope with.

Content Marketing: It means a process that specific target audience can be attracted to, engaged with, and retained using the strategic method of generating, disseminating, and promoting valuable, pertinent, and interesting content (Faruk, 2023). AI helps this content marketing to the media house as well as content creators. The media products could be reached to the target audiences through AI mediated social media like Facebook, YouTube, TikTok. AI-based tools and data analytics can enhance audience analysis and advertising efficacy in Bangladeshi media organizations (Kabir, 2020).

Blogs/ Affiliated Marketing: Blog entries based on digital technology can offer instructive and interesting material, business insights, how-to manuals, thoughtful leadership articles, and more (Norouzi, 2017). In the affiliate marketing, people, or media houses promote the goods or services of other businesses in return for a commission. Contents, media productions can reach through it.

Video/ YouTube Content: Content marketing has got more popular with audio-visual format. This format can consist of webinars, explanation films, interviews, tutorials, product demos, news, views, features and more. Various video contents can be distributed on sites like YouTube, Vimeo, social media, or business websites. The term “YouTube marketing” is the practice of using the YouTube platform as a marketing tool to advertise goods, services, businesses, content and other media productions (Faruk, 2023). In Bangladesh every media production is now being uploaded as YouTube content. People can get easy access various contents in YouTube.

Search Engine Optimization: AI-driven systems can monitor user behavior, preferences, and social media trends to give personalized content recommendations, ultimately improving user experience and engagement (Islam et al., 2021). According to Kapoor (2020), chatbots and virtual assistants driven by AI can improve customer engagement by offering fast, individualized service. This AI optimizes the websites, online contents for the viewers. In future AI driven SEO activities would be more complex and competitive.

DSNG/MING: Now-a-days, signal transmission has tremendously changed due to advanced technology. Television media of our country has used Digital Satellite News Gathering (DSNG) system where camera holds footage and turns into digital signals and is sent to satellite and then transmitted to the destinations. Now this process is replaced by Mobile Internet News Gathering (MING) system where footage taken by camera and transmit through mobile internet system, a very easy and portable devices of boosted speedy internet package. With this MING technology, live broadcast, news coverage from remote areas can easily be done. Industry 4.0 technology is expected to improve this system more in near future.

Media Convergence: The digital technology has forced to introduce online version of traditional media as well as cloud-based storage system. Online new-portal, news feed through social media platforms, audio-visual news, 24 hours updating of news etc. have been doing with the help of digital technology. The news printed in offline, broadcasted in TV channels, the same news is available in digital and social media. So, a sharp convergence of traditional media with digital media blurs the boundaries between print, broadcast, and digital platform that leads to participatory and cross-platform journalism practices (Jenkins, 2006). Media convergence welcomes Industry 4.0 (Prayogi et al., 2020).

Challenges

Digital transformation is key component for Industry 4.0 but in Bangladesh it consists of different hurdles and difficulties. These are lack of readiness in media industry, high investment cost, shortages of required skills and knowledges, uncertainty in investment returns, crisis of adequate fund for investment, and inadequate infrastructure of data security etc. (Meena et al., 2024). Technology adoption for digital transformation amid Industry 4.0 is not only the challenge for media industry, but also for the other sectors in Bangladesh.

Whenever a gigantic change is needed, the stakeholders initially show much reluctance to adopt new changes. In regard to Industry 4.0 new system or innovative procedures are required to be embraced for digital transformation. Simultaneously, lack of adequate funding for establishing necessary infrastructure or support systems is also required for smooth transitions (Bertolini et al., 2024). In media sector of Bangladesh has been facing these challenges due to inadequate funding and shaky mentality of media personnel.

Journalism and media studies education in Bangladesh is not up to the mark to cope with Industry 4.0 hurdles and challenges. Students are optimistic and ready to adopt AI and digital technology (Goni and Tabassum (2020). But public university curriculum of the discipline is not aligned with Industry 4.0 demand. Graduation of knowledge, skills and attitudes of the graduates of journalism and media studies disciple is not adequate for Industry 4.0. Therefore, ability to adjust and take new technology and innovation by the graduates fails to capitalize the benefits of Industry 4.0.

The existing efforts like training and education of enhancing people's knowledge and skills are not aligned with industry 4.0 trends and employment requirements in Bangladesh. It needs to be revised and prioritized with Industry 4.0 demands and requirements.

Global operational readiness is required for getting access to Industry 4.0 phenomenon. The media sector of Bangladesh has inadequate preparedness. The efforts to achieve global operational preparedness pose some challenges in the areas of operational technology, getting international fund, accessing international expertise and networks and technological capabilities (Zhang, 2023).

Bangladesh labor market is very poor and unskilled to meet the demand of Industry 4.0. It is traditional and huge agrarian based. Labor force transformation and align with Industry 4.0 is a serious challenge for the country. So, the labor market dynamics is important to be considered.

Without government support, Industry 4.0 would never be effective and functional. But the reality in Bangladesh is the lack of government support. Industry 4.0 advancement and implementation required consistent government funding and support, aligned between government policies and regulations which are widely missing in Bangladesh (Ilin et al., 2022). At the same time, for rapid technological changes, the regulatory frameworks and media policies have not fully adapted (Ahmed & Dey, 2021). In media industry, government should ensure the facilities, supports and guidelines for implementing Industry 4.0.

Inadequate infrastructure is one of the major constraints for the deployment of Industry 4.0 in Bangladesh. Media industry is not out of it. A stable, reliable and affordable infrastructure like cloud computing, high-speed dedicated internet, advanced data analysts, uninterrupted power supply, country-wide coverage of infrastructure is required for proper functioning of Industry 4.0 technologies (Renshaw, 2021).

In media industry of Bangladesh, workers face constant uncertainty and vulnerability except very few media houses regarding their service continuity and security. So necessary motivations and skills manpower would not be developed and Industry 4.0 would not be beneficial to the media sector.

The political economy of media industry of Bangladesh poses some challenges in the context of Industry 4.0. The Bangladesh media houses are not fully free and fair in terms of government rules and regulations and ownerships. Political power influences the whole industry culture where demand for necessary investment of Industry 4.0 is not possible. The aligning with ruling party determines the industry's decision to maximize profit within existing framework rather than 'out of the box' thinking.

Needs to be done

Industry 4.0 could not be bypassed in the world reality of technological advancement. As Bangladesh stays far behind of Industry 4.0, the media sector is also having same situation. The challenges discussed here hint the remedies. Specifically, the followings could be taken into consideration to take the benefits of Industry 4.0.

- The employees and workers are the driving forces of a media house. Therefore, proper knowledge and skills on Industry 4.0 is required that make them ready to adopt and be accustomed with the new 4IR.

- Journalism and Media curriculum of the country's university is needed to be aligned with Industry 4.0. Without aligning, the graduates would not be cope up with the challenges and the media sector would fall into severe difficulties.
- In media industry, owners and top managements are very influential and integral part. So serious motivation is required to them to implement smart technologies in media houses. Therefore, necessary investments are needed. Otherwise, media houses may not optimize profits from Industry 4.0.
- Human resources could be given abilities, knowledges and skills required for Industry 4.0. So, the skills relating to research, technical know-how, organizational and interpersonal could be given from primary to tertiary level of education through which valuable human resources would be developed in the country. Apart from this, leadership, ability to adapt to changing circumstances, ICT skills, digital proficiency, communication, problem-solving, team building, emotional intelligence, decision making etc. could be given more emphasis to the students.
- Ensuring necessary ICT infrastructure is essential for the implementation of Industry 4.0 and make sure the design and architecture of infrastructure from rural to urban level.
- Education on robotics, artificial intelligence, data sciences and smart technologies could be ensured in university level.
- Serious attention should be given for continuous upgradation of existing and upcoming labor forces aligned with Industry 4.0.
- System and process upgradation is one of the major pre-requisites for Industry 4.0. Even though, once system and process are upgraded but the technological advancement always requires continuous upgradation of system and process. This process optimizes the outputs and production.
- Digital literacy and capacity building are essential for sustainable media development in Bangladesh amid Industry 4.0 (Islam, 2020). It can be ensured from social institutions like family, schools, educational institutions, religious institutions etc. It will promote a positive conviviality and cyber friendliness of individuals and adults could be referents of the children as well.

Conclusion

Industry 4.0 is now a reality of the country. Industry 4.0 creates an ample opportunity for every sector of the country. Media sector of Bangladesh has been flourishing day by day. Technological

advancements push the media sector to be inter-active with the technologies. In part of different sections of media houses viz. reporting, editing, airing, photography, videography etc. have been using updated technologies. AI has also been used by the journalists and media personnels in their day-to-day activities. But the whole industry has been far behind to adopt Industry 4.0 benefits. Media industry readiness is not up-to-the mark. The investment is required. The curriculum of the media and journalism at the university level is not found aligned with Industry 4.0. The government policies need to be also aligned with media flourishing. So, the study findings clearly have answered the questions framed earlier. Having all the challenges, the necessary steps to be taken to yield the maximum benefits from Industry 4.0.

References

- Ahmed, S., & Dey, P. (2021). Media Regulation and Digital Challenges in Bangladesh. *Asian Journal of Communication*, 31(4), 312–326.
- Amran, S. O., Hendra, M. D., Triyandra, A. C., Putera, AB. S. and Adriyani, A. (2023). Adoption of Mass Media Technology on Industry 4.0 Perspective, *Jurnal Ranah Komunikasi (Jrk)* - Vol. 7 No. 1 (2023). <http://ranahkomunikasi.fisip.unand.ac.id/>
- Beckett, C. (2019). New powers, new responsibilities: A global survey of journalism and artificial intelligence. *Polis*, London School of Economics and Political Science.
- Bertolini, S., Goglio, V., & Hofäcker, D. (2024). Objective and subjective employment insecurity and mid-career workers. *Job Insecurity and Life Courses*, <https://doi.org/10.51952/9781529208733.ch004>
- Castells, M. (2007). Communication, Power and Counter-power in the Network Society. *International Journal of Communication*, 1, 238–266.
- Choudhury, T. S., July 20, 2023. AI news presenters: What they mean for the future of newsroom. <https://www.thedailystar.net/tech-startup/news/ai-news-presenters-what-they-mean-the-future-newsroom-3374106>
- Faruk, O. (2023). Impact of Artificial Intelligence on Content Marketing in the Context of Bangladesh. *East Asian Journal of Multidisciplinary Research*, 2(9), 3973-3988. <https://doi.org/10.55927/eajmr.v2i9.4951>
- Foucault, M. (1970). *The Order of Things: An Archaeology of the Human Sciences* (Trans. A. M. Sheridan Smith). Pantheon Books.
- Frey, C. B. and Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change* 114 (2017), 254–280. <https://doi.org/10.1016/j.techfore.2016.08.019>

- Goni, M. A., & Tabassum, M. (2020). Artificial intelligence (AI) in journalism: Is Bangladesh ready for it? A study on journalism students in Bangladesh. *Athens Journal of Mass Media and Communications*, 6(4), pp. 209-228.
- Haraway, D. J. (1985). A Cyborg Manifesto: Science, Technology, and Socialist-feminism in the Late Twentieth Century. *Socialist Review*, 15(2), 65–108.
- Hasan Chowdhury, H. and Md Mahbub Murshed, Md. M. 2020. Information technology in Bangladesh. <http://en.banglapedia.org/index.php?title=Computer>
- Hassan, A., & Albayari, A. (2022). The usage of artificial intelligence in journalism. In *Future of organizations and work after the 4th industrial revolution: the role of artificial intelligence, big data, automation, and robotics* (pp. 175-197). Cham: Springer International Publishing.
- Hutomo, M. S. (2020). Bertahan untuk Hidup: Konvergensi Pers Cetak dalam Industri Digital Media. *CARAKA: Indonesian Journal of Communications*, 1(1), 30–37. <https://doi.org/10.25008/caraka.v1i1.40>
- Ilin, I., Iliashenko, V. M., Dubgorn, A., & Esser, M. (2022). Critical factors and challenges of healthcare digital transformation. *Digital Transformation and the World Economy*, 205 220. https://doi.org/10.1007/978-3-030-89832-8_11
- Islam, M. A. (2020). Digital Literacy and Media Sustainability in Developing Countries. *Media Asia*, 47(3), 189–198.
- Islam, M. R., Rahman, S. M., & Rahman, M. M. (2021). Artificial intelligence: The future of content marketing in Bangladesh. In 2021 12th International Conference on Computing, Communication and Networking Technologies (ICCCNT) (pp. 1-6). IEEE.
- Islam, M. S., & Anam, M. (2021). Mobile Journalism Practices in Bangladeshi Newsrooms. *Journal of Journalism Practice*, 15(6), 742–758.
- Javaid, M., Haleem, A., and Singh, RP. (2023). A study on ChatGPT for Industry 4.0: Background, potentials, challenges, and eventualities. *Journal of Economy and Technology*.
- Jenkins, H. (2006). *Convergence Culture: Where Old and New Media Collide*. New York University Press.
- Kabir, H. (2020). Data-driven Media and Advertising Trends in Bangladesh. *South Asian Journal of Business Studies*, 12(1), 88–101.
- Kapoor, D. (2020). Artificial Intelligence for content marketing in Bangladesh. In 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT) (pp. 1-6). IEEE.

- Karim, M. R., & Haque, M. (2018). Media Convergence and Journalism in Bangladesh. *Global Media Journal*, 16(30), 1–9.
- Khan, A. K., & Shnaider, A. (2021). The features of online news websites in Bangladesh. *Technology Transfer: Innovative Solutions in Social Sciences and Humanities*, pp. 47-49.
- Latar, N. L. (2018). Robot Journalism, Can Human Journalism Survive? World Scientific Publishing.
https://drive.google.com/file/d/1T7MnwHAQO03w3SAHqmGubIQnRLI2xXQ/view?usp=share_link
- McLuhan, M. (1962). *The Gutenberg Galaxy: The Making of Typographic Man*. University of Toronto Press.
- McLuhan, M. (1964). *Understanding Media: The Extensions of Man*. McGraw-Hill.
- Meena, D. K., Singhal, A., Chaudhary, C. K., & Sinha, S. (2024). Electric vehicle charging infrastructure. *Distributed Energy Resources*, 42- 68.
<https://doi.org/10.1201/9781003311829-3>
- Nandini, Indora, P., Singh, R K. (2024). Artificial Intelligence in Journalism: An Overview of its Applications and Uses. *Journal of Communication and Management*. July-September, 2024, Vol. 3, Issue 3. DOI: 10.58966/JCM2024337
- Norouzi, A. (2017). An integrated survey in affiliate marketing network. *Press Academia Procedia*, 5(1), 299-309.
- Partha, S. B., Tabassum, M., Goni, M. A., & Kundu, P. (2024). Artificial intelligence (AI) and future newsrooms: A study on journalists of Bangladesh. *Pacific Journalism Review*, 30(1-2), 96-110.
- Postman, N. (1985). *Amusing Ourselves to Death: Public Discourse in the Age of Show Business*. Penguin Books.
- Prayogi, I. A., Sjaifirah, N. A., & Dewi, E. A. S. (2020). Media Convergence Welcomes Industry 4.0. *Jurnal Komunikasi Ikatan Sarjana Komunikasi Indonesia*, 5(2), 199–204.
<https://doi.org/10.25008/jkiski.v5i2.346>
- Rahman, M. (2020). Mass Communication in the Age of Industry 4.0. *Journal of Communication Technology*, 5(2), 67-79.
- Rahman, M., & Hossain, S. (2022). Artificial Intelligence and Media Ethics in Bangladesh. *Digital Journalism Review*, 4(1), 21–35.
- Renshaw, G. (2021). Continuous growth and the natural exponential function. *Maths for Economics*. <https://doi.org/10.1093/hebz/9780198839507.003.0015>

- Robert C. Allen, R. C. (2018). *The British industrial revolution in global perspective*. Cambridge University Press.
- Roblek, V., Mesko, M., & Krapez, A. (2016). A Complex View of Industry 4.0. *SAGE Open*, 6(2), 1–11. <https://doi.org/10.1177/2158244016653987>
- Sirait, F. E. T. (2022). Dampak Revolusi Industri 4.0 pada Industri Teknologi Komunikasi di Indonesia: Peluang dan Tantangan. *Jurnal Penelitian dan Pengembangan Sains dan Humaniora*, 6(1), 132–139. <https://doi.org/10.23887/jppsh.v6i1.28153>
- Syed Faiz Ahmed, S. F., Pratyasha Saha, P., and Haque, SM T. (2020). Technology Adoption Dynamics of the Press Workers in Bangladesh. In *ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS '20)*, June 15–17, 2020, Ecuador. ACM, New York, NY, USA. <https://doi.org/10.1145/3378393.3402270>
- The Business Standard*, 19 July 2023. <https://www.tbsnews.net/bangladesh/channel-24-introduces-countrys-first-ai-news-anchor-aparajita-668234>
- UNESCO. (2019). *Journalism, Fake News and Disinformation*. UNESCO Publishing. Volume 1, November 2023. <https://doi.org/10.1016/j.ject.2023.08.001>.
- Zhang, Q. (2023). Information of organizational systems based on elderly employees: Behavioural, decision-making, and change resistance in pandemic/post-pandemic scenarios. <https://doi.org/10.2139/ssrn.4341857>
- Zhou, K., Liu, T., & Zhou, L. (2015). Industry 4.0: Towards future industrial opportunities and challenges. *FKSD 2015*, 2147–2152. <https://doi.org/10.1109/FSKD.2015.7382284>