

NAVIGATING THE FOURTH INDUSTRIAL REVOLUTION IN THE PUBLISHING INDUSTRY OF BANGLADESH: PREPAREDNESS, PROBLEMS AND PROSPECTS

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Abstract

The study has explored the perception and preparedness of the publishing industry of Bangladesh, identify problems, analyze the current situation, explore potential prospect. The diffusion of innovation theory has been employed to comprehend the tendency of publishers to embrace new technologies that offer a comprehensive understanding of the current situation and future possibilities of the publishing industry. This research has been conducted through interviews with thirty publishers and two experts who have ideas about the publishing industry and industrial revolutions. A purposive sampling strategy has been employed to choose the desired sample. An open-ended questionnaire has been designed to gather essential information from industry experts and publishers. The result shows that most of the publishers are unaware about the fourth industrial revolution and the preparedness level is also not quite satisfactory. The publishing industry, despite recent technological advancements, is still in the third industrial revolution phase, with young and new publishers showing a strong willingness to adapt to fourth industrial revolution technologies. The primary issue is the absence of a skilled workforce in the publishing industry and the financial constraints faced by publishers. The publishing industry of Bangladesh has the potential for growth and development during the fourth industrial revolution, but requires government and private support. The study recommends implementing awareness programs for publishers and associates to enhance their technological literacy and adaptability to the Industrial Revolution.

Keywords: Publishing, Bangladesh, Fourth Industrial Revolution, Prospects

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Introduction

The publishing industry of Bangladesh faces various challenges such as piracy, inadequate legislation, high production cost, and inadequate technological infrastructure (IPA, 2016; Sadiq, 2024). The publishing Market of Bangladesh is expected to increase at an 8.6% Compound Annual Growth Rate (CAGR) from 2024-2030 (6Wresearch, 2021), driven by technological advancements. The industry needs to diversify and become skilled to keep up with these changes.

The current study examines the understanding of individuals engaged in the publishing industry in Bangladesh regarding the fourth industrial revolution (4IR), their current situation, and their preparedness to embrace emerging technology. The research also assesses the potential prospects and problems of the publishing industry in the perspectives of the 4IR. The increasing mechanization in the industrial sector is leading to a decline in unskilled workers, with McKinsey estimating 5.7 million Bangladeshi workers will be ceased in the next decades (Mirza, 2020). This research examines the competitiveness of the publishing industry of Bangladesh in integrating techno-skills with the industrialized world and its preparedness to absorb technological advancements.

Studies have yet to be conducted on how well-prepared the publishing industry of Bangladesh is for the 4IR. Nonetheless, it is imperative to take prompt action to understand the modern technical landscape of the publishing industry in Bangladesh. This study is crucial for developing countries like Bangladesh because it has greatly helped to understand how the publishing industry is adapting to the fourth industrial revolution in that country.

This study aligns closely with a government initiative built upon the principles of smart citizens, a smart economy, a smart government, and a smart society (Alam, 2023). This vision incorporates the application of cutting-edge technology and inventive approaches to enhance the life standards of citizens, which aligns with the aims of the fourth industrial revolution. The publishing industry's reaction to these industrial revolutions is a microcosm of the greater national strategy. By examining the industry's preparedness to adopt modern technologies such as—Cloud Computing (Cloud computing involves delivering services such as servers, storage, databases, networking, and intelligence via the internet, offering benefits like cost-efficiency, flexibility, and centralized data management. It is widely adopted across industries, including manufacturing, to enhance efficiency and flexibility in production processes), Artificial Intelligence (Artificial Intelligence is algorithm-driven machine intelligence that enables systems to mimic human

cognitive abilities, such as reasoning, problem-solving, and decision-making), Blockchain Technology (Blockchain technology is a secure and transparent digital ledger that records transactions in a permanent, unalterable format using encryption and decentralization, making it well-suited for asset tracking and management), Advanced Analytics (Advanced analytics utilizes advanced methods and tools, including predictive and prescriptive analytics, data mining, and machine learning, to examine intricate data and generate insights that assist in making informed business decisions and shaping strategy.), and the Internet of Things (The Internet of Things refers to a network of interconnected physical objects that, through the integration of sensors, software, and digital technologies, are capable of communicating and sharing data over the internet, including examples such as smart printers and RFID tags used for inventory management), the research will support the development of a smart society and economy to emerge (Raja Santhi & Muthuswamy, 2023; Sharda et al., 2014). It will also address the development of smart citizens through the formation of competent human resources capable of navigating the technological terrain of the 4IR.

The research provides insights into how the publishing industry can support transforming Bangladesh into a smart society (Pal & Sarker, 2023), where economic activity and governance are driven by technology, thus contributing to the country's socio-economic advancement. In summary, the study examines the publishing industry's current state within the context of the industrial revolutions. It bridges the gap with the strategic policy for a technologically sophisticated Bangladesh. This study contributes significant insights for publishing policymakers and stakeholders to understand the progress of the publishing industry towards the Fourth Industrial Revolution. The paper has examined the following questions—

1. What is the current level of understanding of the Fourth Industrial Revolution among the publishers in the publishing industry?
2. What major problems does the publishing industry face in adapting to the Fourth Industrial Revolution?
3. What are the potential prospects and capabilities for the publishing industry from the perspective of the Fourth Industrial Revolution?
4. How prepared is the publishing industry in Bangladesh for the Fourth Industrial Revolution?

The research will aid policymakers in addressing publisher challenges and industrial revolution-related issues, enhancing understanding and implementing

policies to facilitate the application of industrial revolution technology. The study explores the understanding, preparedness, problems, and potential prospects of the publishing industry in Bangladesh within the framework of the 4IR.

Literature Review

Revolutions represent pivotal moments in history. They are often characterized by chaos and radical changes, encompassing events and actions aimed at transforming a country, region, society, industry, or business (Groumpos, 2021). The Industrial Revolution shifted the economy from rural to industrial, bringing creative means of living and working, and dramatically transforming society (Britannica, 2024). Popularized by English economist Arnold Toynbee, this term refers to the period of rapid industrial development and innovation in Britain from 1760 to 1840 (Britannica, 2024).

The First Industrial Revolution, spanning 18th-century Britain, revolutionized transportation and urbanization through steam power and industrial automation, leading to significant growth in income, population, and living standards (Hobsbawm, 1990; Ashton, 1948). The Second Industrial Revolution, led by Henry Ford, revolutionized industrialization and standardization between 1870 and 1914 (Donovan, 1997), utilizing electric power, transforming communication, and transforming lifestyles. The Automation Revolution, a 20th-century industrial revolution, used computers and memory-programmable controllers for partial automation (Fremdling, 1996), transforming industries, enabling globalization, and increasing the value of intellectual property.

The publishing industry in Bangladesh is being transformed by the Fourth Industrial Revolution, also known as Industry 4.0 (Faisal et al., 2024). Cloud computing offers accessibility, security, and collaboration (McDermott, 2021), while the Internet of Things (IoT) collects and shares data without human input (Tao, 2023). The transparent and immutable nature of blockchain technology ensures enhanced security, making it highly resistant to fraud and tampering (Institute of Data, 2023), while artificial intelligence assists in various publishing tasks such as content creation, editing, and proofreading, with examples including Natural Language Processing (NLP) algorithms and virtual assistants like Siri and Alexa (Neubauer, 2023; Marshal, 2020). These technologies assist in predicting future events and informing decision-making by enabling publishers to estimate sales, assess audience preferences, tailor content recommendations, and enhance SEO and content quality (Mann, 2024).

The Industrial Revolution can be seen as converting traditional manufacturing techniques into advanced methods shaped by the technology available at the time (Santhi et al., 2023). The Fourth Industrial Revolution (4IR) has been studied and applied the most today. While the concept of the 4IR is still relatively new, it is now becoming more widely accepted in several industries. Consequently, academics, industry leaders, and policymakers are allocating greater focus to the 4IR (Nwosu et al., 2023).

The article ‘Fourth Industrial Revolution in Developing Countries: A case on Bangladesh’ Islam et al. (2018) highlights significant behind-mentioned progress in deploying Industry 4.0 in Bangladesh, highlighting issues such as weak infrastructure, expensive technology, government support, and knowledge shortages. While the difficulties and opportunities of numerous industries are covered, the publishing industry has been neglected here. That is why this paper covers the current situation of the publishing industry.

Bhuiyan et al. (2020) investigate in the study named ‘Industry 4.0: challenges, opportunities, and strategic solutions for Bangladesh’ the impact of fourth industrial revolution on the industrial units of Bangladesh, concentrating on strategic solutions for its adoption. The authors mention obstacles such as lack of knowledge, money, and digital infrastructure, as well as skill-lagging and socioeconomic challenges. They provide strategic solutions and policy recommendations for the country's execution, underlining the necessity for effective planning and making tactical choices for the 4IR. Our study examined the problems that the publishing industry of Bangladesh is facing and offered possible solutions.

The World Economic Forum (2018) published an article titled ‘How Bangladesh can thrive in the Fourth Industrial Revolution’ that highlights Bangladesh is embracing the 4IR, with young entrepreneurs producing advanced technologies and the government digitizing services. By 2030, half of the population will live in cities. Collaboration from government, companies, and researchers is needed to realize 4IR's full potential. Initiatives like a national workshop led by the Foreign Minister show that Bangladesh is beginning to recognize the full potential of 4IR technology. We presented data on how much it has been reflected in Bangladesh's publishing industry.

In the study titled ‘4th Industrial Revolution and Reality of Industrialization in Bangladesh’ Abdin (2019) introduces the concept of 4IR, including ai, robotics, blockchain, 3D printing, and big data, as well as its impact on human civilization.

It highlights challenges in Bangladesh's SME sector, suggests strategies to adopt 4IR technologies, and calls for government and scholars to overcome practical constraints. Just as this paper explains the current situation of the SME sector and advises on the technical developments that are needed, such a study has to be done in the publishing industry as well, and this has been effective with this investigation.

These studies provided valuable insights into the barriers and scopes regarding Fourth Industrial Revolution (4IR) in Bangladesh. The authors mostly focused on the infrastructural and technological challenges. The publishing houses of Bangladesh tend to have similar obstacles. Nonetheless, the aforementioned researches did not address the publishing industry. Therefore, their studies inspired us to focus the current study on the publishing industry.

Theoretical Framework

This study is based on the theory of Diffusion of Innovations. This theory highlights how inventive concepts, products, or behaviors expand through a population over time. The idea was initiated by Everett M. Rogers in 1962, based on the merging of numerous previous theories and models (Halton, 2023). According to the concept, the invention itself, the communication channels, the time frame, and the social framework are the four main factors that affect the diffusion process. The concept also classifies the adopters of innovation into five distinct groups: innovators, early adopters, early majority, late majority, and laggards (Halton, 2023). These groups differ in their qualities, such as their willingness to take chances, their opinion leadership, and their social position. The theory also posits five steps of decision-making that adopters go through: knowledge, persuasion, decision, execution, and confirmation. This theory may help us understand and predict the adoption and usage of new technologies, goods, or actions by diverse segments of the population. This concept may also assist in organizing and carrying out effective strategies and interventions to promote and ease the spread of innovations. The innovations and technologies emerging from the 4IR, such as AI, IoT, cloud computing, and blockchain, can be understood theoretically and applied to the publishing industry in Bangladesh. These technologies can generate new potential and challenges for the publishing business in Bangladesh, such as raising the quality and efficiency of the publishing process, expanding the market and reach of publishing products and services, and increasing competitiveness. The features of the innovations, the communication channels, the social structure, and the time are some of the factors that affect how new technologies and innovations

spread throughout the publishing industry of Bangladesh. These factors can also be identified and analyzed using the theory. The Diffusion of Innovation theory can help us understand how the publishing industry in Bangladesh views new technologies and innovations, including their benefits, integration, complexity, trialability, and observability; how it shares and exchanges information and experiences about these innovations; how it decides to adopt and use them; and how social norms, values, and expectations of Bangladeshi society and culture affect the industry as a whole.

The embrace of emerging technologies and innovations in the publishing industry of Bangladesh can also be divided and categorized using the diffusion of innovation theory. These groups include innovators, who eagerly embrace new ideas or products; early adopters, who adopt new products early but meticulously; the early majority, who embrace new ideas prior to the average individual; the late majority, who wait until the majority of people have adopted a product before accepting it; and laggards, who adopt new ideas after they have become well-established traditions (Halton, 2023).

This study has presented how people associated with the publishing industry of Bangladesh respond to the use of technologies as an outcome of the Industrial Revolution.

Methodology

Research Design

This research adopted a qualitative procedure to analyze the understanding, current state and preparedness of the publishing industry of Bangladesh for the fourth industrial revolution. The research employed an inductive approach by condensing extensive interview data into summary formats to establish links between research objectives and findings (Thomas, 2006). Moreover, it utilized a qualitative strategy for its adaptive nature, enabling a comprehensive analysis of respondents' perspectives, experiences, and objectives (Kitzinger, 1995 & Berg, 2009).

Study Area

This study has been performed in Dhaka because it is the economic and cultural hub of Bangladesh, where most of the country's major publishing houses are located. Besides Many publishers who may have branches or operations outside Dhaka still maintain their primary offices in the capital. Considering this study, Bangla Bazar, Nilkhet, Elephant Road, and *Amar Ekushey* Book Fair were purposively selected

to collect data because only in these places can many publishers be found together under one roof. Besides, the *Amar Ekushey* Book Fair is a festival where all the publishers participate, making it easy to reach them and collect data.



Figure 1: Map and Location of the Studied Area

(Source: Prepared by the authors)

Sampling

Adopting the purposive sampling strategy, this research included 30 in-depth interviews (IDI) and 2 Key informant interviews (KII). Given the lack of individuals with expertise in the publishing industry and 4IR, two key informants were available for interviews based on their comprehensive understanding of both fields. In-depth interviewing is a qualitative data collection technique that involves conducting detailed individual interviews with a select group of participants to examine their perspectives on a particular topic, program, or issue (Boyce & Neale, 2006). Data has been collected from prominent Bangladeshi publishers, Bangla

Bazar-based publishers, as Bangla Bazar is home to approximately 200 publishing firms and between 3,000 and 3,500 bookstores (Nandy & Rahaman, 2024), and with new young publishers entering the publishing industry.

In most cases, the publisher actively participated in the interview process. However, in select instances, a designated individual with a comprehensive understanding of the publishing house assisted by participating in the interview.

Data Collection and Analysis

The study uses open-ended interviews to understand real-life issues and examine specific information. Interviews were conducted in person and online, lasting 20-30 minutes, and some respondents were willing to send written responses by email. The researcher conducted interviews and questionnaires in Bengali and English, meticulously transcribed and translated them, validated their accuracy through listening, and presented thematically for the study. The interviews have been conducted between February 2024 and April 2024.

This study employed a qualitative design. The approach of choice for analysis is thematic analysis. Through thematic analysis, themes are identified that characterize a situation and are then further elucidated (Daly et al., 1997; Ryan & Bernard, 2000). This is a technique employed to recognize, examine, and document patterns or topics present in a set of data (Braun & Clarke, 2006). This research employs an inductive approach, where themes are identified through the iterative analysis of interview data and research questions. This method allows patterns and insights to emerge from the data itself, leading to the development of codes and conclusions that align with the observed findings, rather than predetermined expectations, thereby refining the study's objectives based on the data collected (Thomas, 2006).

Ethical Considerations

Prior to the interviews, consent forms were signed by all participants to ensure ethical compliance. To maintain objectivity and prevent any bias in the research findings, participant responses were presented anonymously. To maintain interviewee anonymity, this study assigns interview IDs 1 to 30 for the 30 in-depth interviews conducted. This approach adheres to the consent agreements signed by the publishers and preserves the confidentiality of both individuals and their organizations, ensuring that the overall state of the publishing industry is accurately represented without impacting the reputation of specific publishing houses.

Findings

Understanding of the Fourth Industrial Revolution

In-depth interviews reveal that most (12 out of 30) respondents have no understanding of the Fourth Industrial Revolution, with some having a basic understanding but not a detailed understanding. Though some (11 out of 30) have a fundamental understanding of the 4IR; they are familiar with this term but do not have a detailed idea. Only a few (7 out of 30) respondents have a detailed and clear understanding of this. Those with a detailed understanding were able to define the 4IR.

During the interviews, the respondents were questioned about their understanding and knowledge of the 4IR. One of the respondents 6 explained in this regard as follows;

The first industrial revolution, originating from the steam engine, evolved into the fourth with automation technologies, AI-like ChatGPT simplifies manuscript preparation, eliminating the need for paper-based books in the era of e-books, replacing the traditional method of arranging letters and writing lengthy manuscripts. (Respondent 6)

Understanding of and preparedness for the use of technology related to the Fourth Industrial Revolution

Based on the data acquired from the interviews and the responses provided by the respondents, an assessment of the understanding and preparedness for the adoption of technologies associated with the Fourth Industrial Revolution is presented through an analysis of the data.

Cloud Computing

In-depth interviews reveal that many (18 out of 30) respondents are unfamiliar with cloud computing technology and do not incorporate it into their publishing operations. A notable (11 out of 30) portion of respondents, however, possess a comprehensive understanding of cloud computing and actively implement it within their publishing houses. In contrast, a single respondent was aware of cloud computing but chose not to utilize it in their operations.

In the course of the interviews, the respondents were questioned about their understanding as well as knowledge of cloud computing technology. One of the respondents 6 explained in this regard as follows-

Previously manuscripts were written on paper, requiring multiple drafts and a lengthy process. Cloud computing simplifies writing, editing, and suggestions through Google Docs, while storing documents in cloud storage like Dropbox and Google Drive for quick remote work. (Respondent 6)

Cloud computing is widely used by those with a thorough understanding, primarily for backing up manuscripts and maintaining file safety after editing. Dropbox, Google Drive, and iCloud are some of the cloud computing technologies used. The majority of respondents are unaware of and do not use cloud computing technology. Respondent 5 from a publishing house that doesn't use cloud computing technology responded as follows- 'Cloud computing technology is often overlooked by publishing houses owing to insufficient understanding and a skilled workforce, and they need to be made aware of its existence'. (Respondent 5)

Another respondent mentioned having an understanding of cloud computing technology but choosing not to utilize it. One of the respondents, 10, explained the reason for not using it as follows- 'Cloud computing technology is not utilized in publishing houses because the publishing industry has not been fully digitized. Most publishers and their associates still perform tasks manually'. (Respondent 10)

The respondents were asked about the pros and cons of cloud computing, highlighting benefits like secure file storage and software storage. However, they also noted limitations in the availability of free storage, potential difficulties in managing the publishing industry, and the risk of data breaches due to a lack of technological expertise

Internet of Things (IoT)

The in-depth interviews revealed varying levels of understanding and utilization of IoT technology among respondents. A notable group (9 out of 30) expressed a lack of knowledge and application of IoT in their publishing operations. The majority (13 out of 30) of respondents demonstrated a basic awareness and use of IoT; however, four participants were unaware that their operations were already utilizing IoT technology. Meanwhile, another four individuals had a clear understanding of IoT but chose not to incorporate it into their publishing houses. These findings highlight a diverse range of IoT awareness within the publishing industry.

A respondent who has an idea about IoT technology but does not use it, respondent 6, expressed that in this regard as follows – 'The publishing house's failure to utilize IoT is accountable for the shortage of devices and lack of competent technology

staff'. (Respondent 6)

IoT technology is being utilized in the publishing industry of Bangladesh, including smart printers and QR codes for identity and offer information, as well as in marketing. IoT users are reluctant to discuss its benefits because the ideas are still in the early stages. They acknowledge its advantages in understanding reader needs but caution about potential data loss and disruptions. Despite this, many are eager to adopt IoT technology soon.

Blockchain Technology

Through in-depth interviews, it was found that a significant majority (22 out of 30) demonstrated little to no understanding of blockchain technology. Conversely, a small number (8 out of 30) of respondents exhibited a basic level of familiarity with the technology. Despite these varying levels of awareness, none of the interviewees reported employing blockchain technology within their publishing houses. This indicates a general lack of adoption and integration of blockchain technology in the industry, despite some degree of conceptual awareness among a portion of the respondents.

The majority of the respondents are unaware of blockchain technology. Those who are familiar with it share royalties through mainstream banking and mobile financial services (MFS), but they did not comment on its advantages and disadvantages.

Artificial Intelligence (AI)

-depth interviews revealed that a considerable number (14 out of 30) of respondents demonstrate a comprehensive understanding of artificial intelligence (AI) and actively incorporate this technology within their publishing houses. This reflects positive progress for the publishing industry in Bangladesh, indicating growing familiarity with and adoption of emerging technologies. Additionally, several respondents (10 out of 30) possess an understanding of AI but have not yet integrated it into their operations. Notably, a minority (6 out of 30) of respondents are neither familiar with AI nor utilize this technology in their publishing practices.

In the course of the interviews, the respondents were questioned about their understanding and knowledge of artificial intelligence. One of the respondents explained in this regard as follows – ‘Artificial intelligence is a form of robot that functions as an assistant to augment human intelligence and creativity’. (Respondent 30)

Most of the respondents who have an idea about artificial intelligence are using it in their publishing houses. Artificial intelligence is being used in the publishing industry of Bangladesh for designing logos, covers, marketing content, and social media posts, utilizing technologies like ChatGPT, BARD, Gemini, Claude, Midjourney, and DALL•E.

The interview data reveals that despite being familiar with artificial intelligence, around one-third of respondents do not utilize this technology. Respondent 10 explained the reason for not using artificial intelligence in the publishing house despite having an understanding and familiarity with it as follows- ‘AI’s potential in publishing is being explored, but its lack of emotion and humanized uniqueness make it less exciting to use in creative areas’. (Respondent 10)

Many publishing houses view artificial intelligence as a human competitor, prioritizing knowledge over AI in their organizational principles. However, proper technological literacy is necessary for effective control. The benefits include diverse cover designs and fast calculations, but the drawbacks are the inability to produce precise results, a lack of aesthetic quality, and language limitations in editing. When used in Bangladesh, the AI cannot capture the Bengali language, making it challenging for editing.

Advanced Analytics Technology

In-depth interviews reveal that the majority (20 out of 30) of respondents lack knowledge of advanced analytics technology and do not employ it in their publishing houses. A segment of respondents are aware of the technology and utilize it, though their understanding of its core principles remains limited. A number (9 out of 30) of respondents demonstrate a basic comprehension of advanced analytics and actively incorporate it into their operations. Notably, one respondent reported having a fundamental understanding of the technology but does not currently apply it in their publishing house.

A respondent who has an idea about advanced analytics technology but does not use it, respondent 6, expressed the reason for not using it as follows, ‘The small-scale publishing house currently lacks significant need of it, but the availability of skilled workers and software may hinder its future growth’. (Respondent 6)

Advanced analytics technology is mainly used in market research, analyzing customer behavior, and spotting risks. It’s common for publishers to work with third-party organizations such as Rokomari.com and Facebook. In Bangladesh’s

publishing industry, sales teams currently manage customer needs and demographics manually. Creative publishers are facing a decline in market demand and need to create tailored books to meet reader preferences. Therefore, having detailed market and readership research data is crucial, which is why there is a growing interest in using advanced technologies for the future.

The respondents discussed the benefits and drawbacks of advanced analytics technology, highlighting its benefits in understanding customer trends, business development, risk reduction, informed decision-making, and reducing the gap between organizations and readers. Advanced analytics technology requires skilled personnel, extensive data, and software, which is lacking in the publishing industry of Bangladesh due to its lack of proper environment.

Problems Confronted by the Publishing Industry

The publishing industry of Bangladesh faces challenges in embracing the opportunities associated with the Fourth Industrial Revolution because of its inability to fully utilize its technology. Respondent 6 is in response to the challenges confronted by the publishing industry in adopting the opportunities that the present world is using and has in the present world, as follows-

The publishing industry is dealing with issues such as insufficient government support, lack of paper subsidies, syndicate violence, and negative attitudes towards smaller publications. Additionally, outdated computer software and hardware are inadequate. (Respondent 10)

The Industrial Revolution has accelerated book dissemination, increased piracy, and created financial challenges for publishers in Bangladesh. Additionally, weak copyright laws and a shortage of skilled workers make the publishing industry even more complicated. Respondent 14 provided the following explanation in response to the question regarding the issues facing Bangladesh's publishing industry in the context of the 4IR and possible solutions-

The publishing industry struggles with low innovation and ethical issues, requiring more research and market analysis. To increase demand and export books, more publicity and collaboration with experts are needed. (Respondent 14)

In response to the same question, respondent 17 explained in this regard as follows-

The publishing industry is dealing with uncertain conditions and low profits. Although technology could help increase profits, the limited profits

make it difficult for people to adopt it. Understanding reader preferences and achieving good results requires time and training. (Respondent 17)

Regarding the challenges in adopting Industrial Revolution technologies in the publishing industry of Bangladesh, one key informant remarked that–

Most people involved in the publishing industry in Bangladesh lack technical knowledge. There is no mindset to embrace modern technology. Publishers in our country are not focused on the larger market and, as a result, have no plans to develop or adapt to the modern world technologically. Those associated with the publishing industry prefer conventional methods and are reluctant to accept technologically advanced and innovative solutions, viewing them as challenges. Furthermore, the industry lacks adequate technological support, which is another significant obstacle. (Mahbub, Personal Communication, March 8, 2024)

In response to the same query, another key informant II highlighted that–

The primary challenge in adopting Fourth Industrial Revolution technologies in the publishing industry of Bangladesh is that most people in the industry are unaware of them. This ignorance about technology is one of the major barriers to progress in this industry. (Dhar, Personal Communication, April 16, 2024)

Potential Prospects and Capabilities of the Publishing Industry in the Perspective of the Fourth Industrial Revolution

Interviewees within the publishing industry of Bangladesh convey a positive outlook regarding the potential of technologies related to the Fourth Industrial Revolution, believing it will boost growth, create world-class products, and generate foreign exchange. They seek government support and foresight. The interviewees affirmed that while technological advancements have occurred in the publishing industry, this is not a significant leap, as Bangladesh has been utilizing the technology of the third industrial revolution.

When asked if the publishing industry has advanced technologically over the past few years compared to the present, respondent 19 said- ‘The publishing industry has experienced significant technological advancements, including the shift from handwriting to computer typing’. (Respondent 19)

Which is actually the technology of the third industrial revolution. As a result, it is clear how high the level of technological development in Bangladesh’s publishing

industry is. In response to the same question, respondent 28 explained in this regard as follows-

The publishing industry has experienced significant technological advancements, reducing manual work to 40-50 percent. AI technology, like ChatGPT and MidJourney, is revolutionizing content creation and social media marketing. They enable Unicode printing, reduce office work, and make publishing more accessible and diverse. (Respondent 28)

When inquired about the potential and capability of the publishing industry of Bangladesh to adapt to the 4IR and the type of support required for this transition, respondent 21 remarked-

Bangladesh's publishing industry has great potential, but it is essential to focus on developing skilled human resources and training both young people and society. Government interest and input are also necessary for creating better policies. (Respondent 21)

In response to the same question, respondent 30 explained in this regard as follows-

Bangladesh's publishing industry has the potential to adapt to the fourth industrial revolution but needs better infrastructure and skilled manpower. The industry's hub, Banglabazar, faces transportation and load-shedding issues. Government intervention is crucial for infrastructure development and technology adoption, as skilled manpower can continuously upgrade with new technology, enabling industry adaptation effectively. (Respondent 30)

In response to the query about the potential and capability of the publishing industry in Bangladesh to adapt to the Fourth Industrial Revolution, both the key informants believe that the industry possesses the potential and capability to embrace both the Fourth and Fifth Industrial Revolutions. However, they emphasize that for this adaptation to occur, substantial improvements in economic and technological conditions are necessary. This process will require considerable time and careful planning.

Preparedness of the Publishing Industry about the Fourth Industrial Revolution

All respondents asserted their preparedness and eagerness to leverage technologies associated with the Fourth Industrial Revolution (4IR), although this enthusiasm appears to be more aspirational than actionable. In practice, none have yet

implemented significant changes or adopted these technologies. Many have expressed an intention to modernize their organizations and to recruit skilled professionals in the future. Although there is a collective assertion of preparedness to embrace Fourth Industrial Revolution (4IR) technologies, it is widely acknowledged that the publishing industry is still in the preparatory stages.

Preparedness of the Overall Publishing Industry

Individually, numerous publishing houses within the industry are prepared to leverage the technologies associated with the Fourth Industrial Revolution. However, the majority of respondents concur that, collectively, the publishing industry in Bangladesh has not yet fully equipped itself to exploit the advancements of the 4IR.

A review of the data collected from the study indicates that a small number (4 out of 30) of respondents believe the publishing industry is ready to adopt and benefit from technologies associated with the Fourth Industrial Revolution (4IR). One respondent noted that the industry is in the early stages of preparing for this transition. However, the overwhelming majority (25 out of 30) of respondents indicated that the publishing industry in Bangladesh is not yet equipped to fully embrace and utilize 4IR technologies. Despite this, all respondents conveyed optimism about the industry's potential for future adaptation and integration of these innovations.

When asked about the level of preparedness of the publishing industry in Bangladesh to use and take advantage of the 4IR, respondent 4 explained in this regard as follows-

When it comes to preparation, the fourth industrial revolution is far from us. We have yet to benefit from the technology of the third industrial revolution fully. The publishing industry is not yet fully prepared. Machines are backdated, and binding is mostly done by a manual process, which often results in loss of pages and various forms of damages. (Respondent 4)

When questioned on the same topic, respondents 5, 7, 12, 23, 15, 16, 19, and 25 opined that the publishing industry of Bangladesh as a whole is not ready to use the technologies of the 4IR.

However, in response to the query regarding the observation of the preparedness of the publishing industry in Bangladesh in the context of the 4IR, one key informant remarked that—

The publishing industry is still down on its knees. Although some technology has impacted the industry, it is still in the third industrial revolution phase. There is no visible preparation or planning for the industry's advancement. As a result, the industry continues to fall further behind. The publishing industry of Bangladesh is still largely dependent on traditional methods. The machinery and technology used are outdated and no longer suitable for today's needs. These older systems persist due to limited facilities, and the industry lacks a skilled workforce capable of using modern technology. (Mahbub, Personal Communication, March 8, 2024)

In response to the same query, another key informant highlighted that—

The publishing industry in Bangladesh is not yet fully prepared to integrate the tools of the Fourth Industrial Revolution. While there have been significant technological advancements in post-production, no improvements have been made in pre-press processes in the context of the Fourth Industrial Revolution. (Dhar, Personal Communication, April 16, 2024)

Respondent 27 provided the following statement when asked why the publishing industry is not prepared for the 4IR and is not utilizing technology to its full potential-

In many cases, publishers are unwilling to adequately prepare for the advancements of the Fourth Industrial Revolution. They think it will destroy individuality and increase the tendency to copy. But if we want to keep pace with the world, it is necessary to adopt and apply technological advancement.” (Respondent 27)

When asked how ready Bangladesh's publishing industry is to use AI and automation, respondent 6 said- ‘The publishing industry in Bangladesh is not yet ready to use AI and automation. There is a lack of skilled manpower and technology in this industry’. (Respondent 6)

In response to the same question, another respondent, 21, explained in this regard as follows-

There is also a shortage of educated publishers in the publishing industry. Most of the binderies have now made their debut as publishers, and book fairs are indeed where many more become voluntary publishers. So, this clearly shows the state of the publishing industry. (Respondent 21)

Many people have shown interest in automating binding, as manual binding often leads to book damage or lost pages, which respondent 1 feels can be greatly reduced by integrating automation into this technology. In regards to this, when respondents were asked what type of efforts may be made to prepare the publishing industry of Bangladesh for the 4IR, respondent 25 said- ‘Publishers and all related parties need to focus on skill-based and technology-based learning to keep up with this industrial revolution’. (Respondent 25)

In response to the question about the barriers that are stopping people from taking advantage of 4IR technologies, respondent 21 explained in this regard as follows- ‘We are not yet mentally ready to adopt the technology’. (Respondent 21)

When asked about the publishing industry’s ability and potential to leverage technologies from the 4IR, respondent 14 stated-

Although traditional publishers are hesitant to adopt technology, the publishing industry is shifting towards embracing it. New entrants and young publishers are showing enthusiasm for this change. (Respondent 14)

Respondent 10 further added that-

The publishing industry is undergoing a significant shift towards technology adoption, which requires publishers to be validated by a single authority. Advanced publishing houses should share their knowledge to help both less advanced and more advanced publishers. (Respondent 10)

Technology Adoption Tendency

Prior to conducting research interviews, the researcher provided participants with an overview of the five categories within the Diffusion of Innovations theory related to technology adoption. Upon analyzing the study data, it becomes evident that the industry includes a notable presence of early adopters who demonstrate a cautious yet proactive approach to integrating new technologies. A handful number (10 out of 30) of respondents were identified as early adopters. Additionally, a couple of respondents aligned with the early majority group, while another pair associated themselves with the late majority. The early majority tends to adopt technology earlier than the general population, while the late majority typically waits for broader acceptance before doing so. A small number of respondents (4 out of 30) were categorized as laggards, adopting new technologies only once they have become well-established norms. Furthermore, several (6 out of 30) respondents positioned themselves as innovators, showing a strong enthusiasm for embracing

and implementing emerging technologies. Lastly, a similar number of respondents remained neutral, choosing not to classify themselves within any specific category of technology adoption.

Discussion

The study demonstrates the understanding and preparedness of the publishing industry of Bangladesh for the Fourth Industrial Revolution. Interviews with thirty publishers and two key informants revealed that most publishers lack an understanding in reference to the 4IR, and their preparedness level is inadequate. Since most publishing houses are based in Dhaka, their problems and conditions are often similar. In addition, the hubs from which the data is collected generally suffer from similar problems and advantages. Yet to overcome this problem, data is collected from *Amar Ekushey* Book Fair, where publishing houses from all over the country are found together. The study also examines the current state of the publishing industry, as well as the problems and potential prospects in the perspective of the 4IR. The publishing industry faces challenges in adopting new technologies due to a shortage of skilled workers, financial constraints, a lack of understanding, ignorance, infrastructure underdevelopment, and a lack of a technology adoption mindset. While the industry has made technological progress, it is still in the third industrial revolution phase. However, young and new publishers show a strong willingness to embrace Fourth Industrial Revolution technologies.

There is a dearth of research data available online concerning the current level of understanding associated with the 4IR among publishers in the publishing industry from all over the world. The scarcity of information makes it challenging to assess the adaptation of rapid technological advancements by the publishing industry. Our research explored this factor in the context of the publishing industry in Bangladesh and identified a widespread lack of awareness.

The publishing industry is adapting to 4IR globally through technological advancements. Major publishing houses, including Penguin Random House, have already shifted from traditional print to digital platforms, which are more flexible, accessible, and cost-effective for readers (Rougeot, 2015; Sblemast, 2017). However, our findings showed that the majority of publishing houses are still heavily dependent on traditional platforms, and they are conservative about adapting digital platforms. On the other hand, the utilization of AI and machine learning is another indicator of 4IR adaptation. Publishing giants such as Penguin Random House, Forbes, Reuters, Bloomberg, and The British Medical

Journal (BMJ) are using AI in editorial processes to ensure fast processing and accuracy (Andreev, 2024 & Pop, 2024). Several global publishing houses are analyzing reader preferences and recommending books based on machine learning algorithms (Pop, 2024). In Bangladesh, we found that a few publishers are using advanced analytics technologies for marketing purposes only. Since, the existing Large Language Models (LLM) lack proficiency in Bengali, publishers cannot use them for copyediting Bengali books.

One of the major problems that the publishing industry faces in adapting to the Fourth Industrial Revolution is piracy and copyright issues. It is the biggest global challenge ever for the publishing giants. Websites such as Scihub and Libgen offer pirated publications without charge, which is negatively impacting the original publishers (Lobo, 2024). The same problem exists for publishers in Bangladesh. Publishers are unwilling to adapt to digital formats since they will be more susceptible to piracy. Furthermore, copyright laws are not rigorously enforced in Bangladesh.

Most of the publishing giants have already increased their capabilities using advanced technologies such as data-driven insights, e-books and audiobooks, interactive and multimedia content, digital distribution, and so on that align with 4IR. Unfortunately, these technologies are mostly unexplored by publishers in Bangladesh. During the interview session, only a few respondents to this study, such as the publishers of Benzene Prokashon and Adarsha, mentioned that they are acquainted with data-driven insights for marketing and digital distribution through social media and their own websites. Therefore, there are numerous opportunities for the publishing industry of Bangladesh to develop its capabilities during the Fourth Industrial Revolutionary era.

Based on the Diffusion of Innovation Theory, the study reveals a high number of early adopters in Bangladesh's publishing industry, with ten respondents identifying as early adopters, two as early majority, two as late majority, four as laggards, and six as innovators, indicating a tendency towards new technology adoption. A group of six participants remained noncommittal, declining to identify with any specific technology adoption group. Among the thirty respondents, merely six belong to the innovator group, reflecting the reluctance of the publishers to quickly adopt new technologies. Despite the financial constraints, an increase in the number of innovators may bring transformative changes to the publishing industry.

The data contributes to a clearer understanding of the publishing industry from the perspective associated with the 4IR. This study will assist academicians, policymakers, and stakeholders in understanding the current state of the publishing industry as well as in formulating proper policies that can put the backward industry on the same footing with other mainstream technologically advanced industries.

Conclusion and Recommendations

Through this research, the understanding and preparedness of the publishing industry in Bangladesh have been explored in the framework of the 4IR. It also highlights the preparation, problems, and potential prospects for the publishing industry to adopt and leverage the technologies relevant to the fourth industrial revolution. The findings of the study hold significant practical implications for policymakers and the government as they address the contemporary state and dynamics of Bangladesh's publishing industry. The research offers a theoretical augmentation to the existing scholarly discourse in several dimensions. While prior studies have explored other industries and industrial revolutions, this is the first study to offer an in-depth, extensive understanding of the publishing industry through the lens of the 4IR. The study reveals that the majority of the publishing industry is unaware of the fourth industrial revolution, and there is a lack of skilled personnel. However, if the publishing industry and those related to the industry are made aware of and trained about the Industrial Revolution and its technology, the publishing industry of Bangladesh will be able to take advantage of the technology of the Industrial Revolution. This will later contribute to the advancement, expansion, and development of the publishing industry. To achieve this, the government as well as private sector should provide financial and technical support to the publishing industry.

- In the current scenario, we recommend government and respective authorities to organize training and workshops to increase technological literacy and awareness among the associates of publishing industry.
- Publishing houses specially the new ones should be assisted with advanced technological support. Established houses may collaborate with the new comers with technological support whereas the new comers will generate innovative ideas for established ones.
- Publishing houses should recruit individuals proficient in digital tools and modern publishing technologies.

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