

MANAGEMENT OF PUBLISHING INDUSTRY BUSINESS TO SUPPORT CHANGE OF TECHNOLOGY IN THE DIGITAL AGE

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Abstract

Nowadays, the publishing business has been affected by changing trends. The research objective intentionally simulated the structural equation modeling of the management of the publishing industry business to support change. Qualitative research involved in-depth interviews with 9 experts and a focus group with 11 successful businesspersons to validate this model. Quantitative data were gathered from 500 entrepreneurs in the publishing industry using a questionnaire, involving statistical tests such as descriptive analysis, inferential analysis, and multivariate analysis. The research reveals strategies for managing the publishing industry business to adapt to technological changes in the digital age, composed of 4 aspects. The most important items of each aspect are as follows: 1) Hi-tech technology & innovation ($\bar{X} = 4.06$) design of an automatic print head maintenance system that makes it faster, more accurate, and undamaged 2) cooperation network ($\bar{X} = 4.03$) thing is to define a clear agreement on the relationship with the network operator 3) organization adaptation ($\bar{X} = 3.92$) solve the problem that the customer recommends appropriately and 4) marketing orientation ($\bar{X} = 3.70$) delivering products and services to customers on time and quickly. Furthermore, the hypothesis test indicated that the difference in enterprise sizes did not show significant variations at the 0.05 level. The analysis of the developed structural equation model demonstrated its accordance and harmony with empirical data, passing the evaluation criteria. The Chi-square probability level, relative Chi-square, goodness of fit index, and root mean square error of approximation were 0.204, 1.090, 0.966, and 0.013, respectively.

Keywords: Publishing Business, Hi-tech Technology and innovation, Organization Adaptation, Marketing Orientation, Cooperation Network

Introduction

The publishing industry, deeply rooted in history and tradition, has been a cornerstone of information dissemination and commercial enterprise. However, the landscape of this industry is undergoing a profound transformation in the face of globalization and the digital age. Technological advancements, coupled with changing consumer behaviors, pose multifaceted challenges to traditional publishing practices. The advent of online media, shifts in advertising revenue, and evolving consumer preferences necessitate a strategic approach to managing the publishing industry business. This study delves into the dynamic realm of publishing, specifically focusing on how businesses within this sector can strategically navigate and adapt to the changing technological landscape of the digital age. The objective is to explore effective management strategies that empower publishing industry entrepreneurs and stakeholders to not only survive but

thrive amidst these technological shifts. Through a comprehensive examination of high-tech technology, innovation, collaboration networks, organizational adaptation, and marketing orientation, this research aims to provide valuable insights and a roadmap for businesses to enhance their competitiveness in an increasingly digital world

The newspaper industry in Thailand, with its deep historical roots dating back to the 19th century, has played a vital role in both public information dissemination and commercial enterprise. Nevertheless, faced with the rapidly evolving global landscape characterized by globalization and the information age, newspapers are grappling with multifaceted challenges. They must simultaneously uphold their role as public institutions entrusted with delivering accurate and timely news while navigating the demands of a competitive non-governmental business environment. This delicate balance highlights the complex and evolving nature of the newspaper industry as it strives to remain relevant and adaptive in changing times (Sakulsri, 2011).

The advertising revenue of newspapers from 2018 to 2022 decreased continuously, with amounts of 15,617 million Baht, 14,869 million Baht, 11,965 million Baht, 8,925 million Baht, and 6,100 million Baht, respectively. Similarly, magazine advertising revenue for the same period also continuously declined, with 4,171 million Baht, 3,642 million Baht, 2,558 million Baht, 1,600 million Baht, and 1,300 million Baht, respectively. Additionally, data from the Department of Business Development (2022) showed a consistent downward trend in the total revenue of the publishing industry from 2018 to 2022, as depicted in Figure 1.

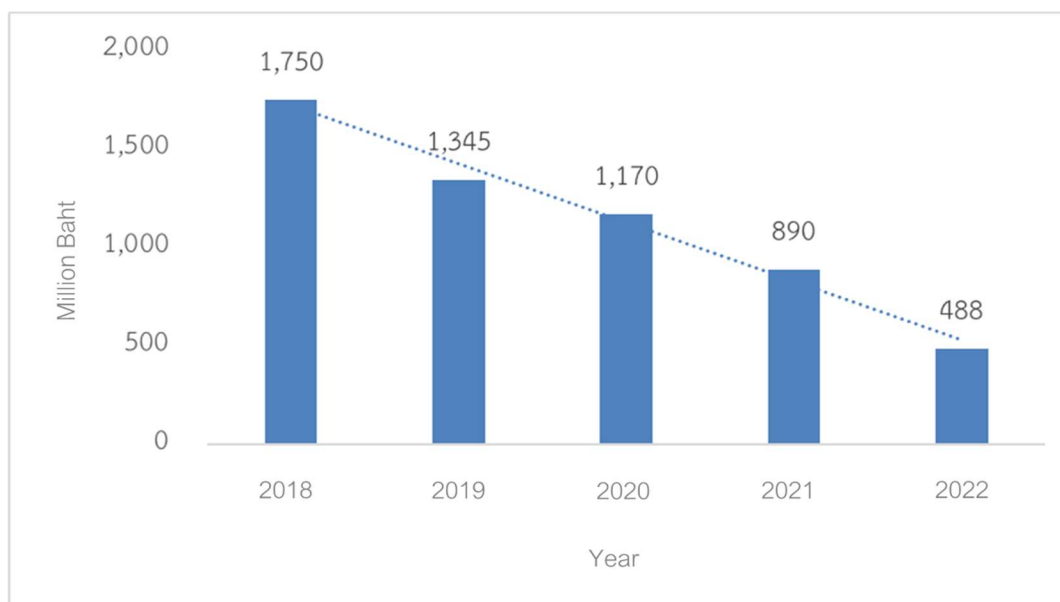


Figure 1: Total Revenue of the Publishing Industry
(Department of Business Development, 2023)

Given the changing landscape of the publishing industry, this study explores effective business management strategies. It aims to offer a roadmap for publishing entrepreneurs and

stakeholders to enhance their competitiveness against online media. The goal is to empower industry players to respond to changes and sustain their businesses successfully.

The research objectives

1. To study the structure and general operating characteristics of the publishing industry business.
2. To study the components of business management in the publishing industry to support changes of technology in the digital age.
3. To develop a structural equation model for managing the publishing industry to support changes of technology in the digital age.

Literature Review

Technology, the practical application of scientific knowledge, is a driving force behind progress and efficiency in modern society. Paired with science, it plays a pivotal role in continuous development across various domains. The journey of technological advancement involves research, development, and dissemination, leading to iterative problem-solving and valuable innovations (Sukhawattanakun, Roopsing & Silpcharu, 2023). These innovations often manifest as intellectual property, contributing both commercially and nationally. Ultimately, the aim of technological development is to elevate methods, processes, patterns, and products, ensuring real-world relevance and enhancing overall quality (Carroll, 2017). Organizational adaptation refers to the organization's use of strategies and structures as tools to manage and respond to rapidly changing environmental conditions, including changes in the economic and social aspects (Sarta, Vergne, & Durand, 2018).

Workplace collaboration, or collaborative work, embodies active participation and teamwork, where individuals and organizations unite to pursue common goals and achieve meaningful outcomes. Sukhawattanakun (2023) emphasizes sharing resources, responsibilities, and a collective vision to address challenges and capitalize on innovative opportunities. Members willingly contribute their skills and competencies, ensuring that operations align seamlessly with the organization's overarching goals (Trungtreechart & Monpanthong, 2023).

Creative marketing is a strategic approach that utilizes innovative ideas to distinguish products or services from competitors, emphasizing cost-effective production, problem-solving, and adaptability to meet consumer needs in a dynamic market. Marketers with diverse skills engage in fresh thinking, creating memorable campaigns with an impact on brand identity, product or place identity, and community lifestyles. The focus is on accessible marketing channels, consumer-friendly pricing, and promotional efforts through public relations, media, and creative activities (Singh & Ahmed, 2023).

Conceptual Framework and Hypotheses Development

From the concepts and theories, the researcher can summarize the management of the industry business to accommodate changes into four components: High-Tech Technology &

Innovation, Organization Adaptation, Cooperation Network, and Marketing Orientation, as illustrated in Figure 2.

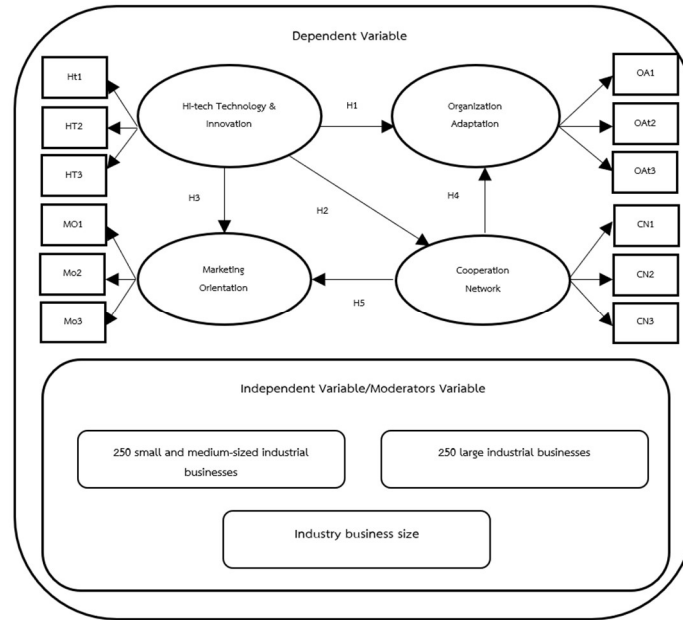


Figure 2: Conceptual Framework
Source: Prepared by authors (2023)

Hypothesis 1 (H1): *The “Hi-tech Technology & Innovation” element directly influences the “Organization Adaptation.”*

Hypothesis 2 (H2): *The “Hi-tech Technology & Innovation” element directly influences the “Cooperation Network.”*

Hypothesis 3 (H3): *The “Hi-tech Technology & Innovation” element directly influences the “Marketing Orientation.”*

Hypothesis 4 (H4): *The “Organization Adaptation” element directly influences the “Cooperation Network.”*

Hypothesis 5 (H5): *The “Cooperation Network” element directly influences the “Marketing Orientation.”*

In summary, the importance of managing the publishing industry business to accommodate changes does not differ significantly when classified according to the size of the industry.

Methodology

The research approach used was mixed-methodology research 1. Qualitative research using in-depth interviews. 2. Quantitative research using surveys. 3. Qualitative research using focus group discussions.

Population and Sample

1. Qualitative research using in-depth interviews: The research population for this study consisted of 9 experts. Purposive sampling was employed to select a specific and targeted sample group, including: 1. Business owners or managers in the publishing industry business 2. Managers

of government agencies or related organizations involved in the publishing industry business 3. Academic experts specializing in the publishing industry business management.

2. Quantitative research: The research population for this study included 1,394 individuals who are business owners or managers in the publishing industry business. (Department of Business Development, 2023)

3. The qualitative research using the focus group discussion technique to support the model was conducted with a sample population of 11 qualified individuals. Purposive sampling was employed to select this sample.

Research instruments

The characteristics of the tools used in this research can be divided according to the nature of the research methods as follows:

1. Qualitative research with in-depth interview techniques; the research instrument used is a structured interview, in which the researcher will set an interview guideline with 4 elements: 1. Hi-tech Technology & Innovation 2. Organization Adaptation 3. Cooperation Network 4. Marketing Orientation.

2. Quantitative research using a questionnaire as the research instrument is divided into 4 parts. Part 1 is a questionnaire regarding the general status of the publishing industry. The nature of the questionnaire is a checklist with 5 items. Part 2 is a questionnaire regarding the structure and general operating characteristics of the publishing industry business. The nature of the questionnaire is a checklist with 20 questions. Part 3 is a questionnaire about business management in the publishing industry to support change. The nature of the questionnaire is a rating scale with 100 items, which has criteria for giving weight to the evaluation in 5 levels according to the Likert method as follows (Silpcharu, 2020)

3. Qualitative research Using the focus group discussion technique, the research tool was a conversation recording.

Data collection method

1. Qualitative research with in-depth interview techniques (In-depth interview)
2. Quantitative research of publishing industry operators in small and medium-sized industries with large industries, numbering 500 cases by sampling.

3. Qualitative research with the group discussion technique, recordings from the conversations are used. A group discussion moderator (Moderator) proposes topics for discussion to induce the group to create ideas and express opinions on issues or directions for discussion in a broad and in-depth manner.

Data Analysis:

Data analysis involves both descriptive and inferential statistics. Descriptive statistics are computed using the SPSS software, while multivariate statistics and structural equation model development are performed using the AMOS software. The criteria used for evaluating the data-model fit include the following four values: Chi-square probability level ($CMIN-p > 0.05$), relative Chi-square ($CMIN/DF < 2.00$), goodness of fit index ($GFI > 0.90$), and root mean square error of approximation ($RMSEA < 0.08$). (Arbuckle, 2016)

Result

Results of the data analysis on the structure and operational characteristics of the general of Publishing Industry Business, comprising 20 key points, indicating the highest percentage in each point, are as follows:

Table 1 The data analysis on the structure and operational characteristics of the general of Publishing Industry Business, comprising 20 key points, indicating the highest percentage

The structure and general operational characteristics of the print media industry	Number	Percent (%)
1. Sufficiency economy concept the organization has applied this concept to achieve excellence.	217	43.40
2. The highest include providing knowledgeable, quality and continually improving services.	277	55.40
3. The Source of funds used the highest includes loans from banks or financial institutions.	384	76.80
4. Customers of the business the highest include the private sector.	196	39.20
5. The source of raw materials that are the main components of the service the highest include use only raw materials imported from abroad.	176	35.20
6. Popular marketing promotion tools the highest include selling using salespeople	337	67.40
7. Educational qualifications of personnel the highest include under bachelor's degree	217	43.40
8. Proportion of labor the highest include the proportion of Thai workers is more than 50%.	235	47.00
9. Using technology and innovation to increase capabilities the highest include service quality control	376	75.20
10. Most of the raw materials belong to whom to accept the work the highest include service recipient or employer	266	53.20
11. His work has largely focused on core values the highest include quality and standards of service	425	85.00

The structure and general operational characteristics of the print media industry	Number	Percent (%)
12. Being fined for submitting work late or submitting work that is not of good quality the highest include never been fined	304	60.80
13. The most important problem in service provision the highest include high competition undercuts each other.	267	53.40
14. Standards are important the highest common include ISO standards.	381	76.20
15. The delivery of work to the customer was later than scheduled the highest include no late delivery	246	49.20
16. Strategies for navigating the crisis from the COVID-19 outbreak situation the highest include service price reduction	168	33.60
17. Strengths in operations the highest include quality of service	212	42.40
18. Weaknesses in operations the highest include modern machinery and production technology	215	43.00
19. The most important internal factors that affect the business the highest include technology and information	240	48.00
20. The most important external factors that affect the business the highest are customers.	193	38.60

When classifying industrial businesses by size—small and medium-sized versus large—it's evident that large industrial businesses prioritize managing the publishing industry business to support technological change in the digital age more than their smaller counterparts. However, in the other two aspects, small- and medium-sized industrial businesses place greater emphasis on adapting to technological changes in the publishing industry. Overall, small and medium-sized industrial businesses attribute high importance to these aspects

Table 2 The average and standard deviation of the importance level of components in managing the publishing industry business to changes of technology in the digital age, classified by the size of the industry.

Factor of Management of Publishing Industry Business to Support Change of Technology in The Digital Age	Small and medium size			Large size		
	\bar{X}	S.D.	Importance Level	\bar{X}	S.D.	Importance Level
Overall level of importance of components	3.93	0.49	High	3.93	0.40	High
1. Hi-tech Technology & Innovation	4.05	0.48	High	4.07	0.46	High
2. Marketing Orientation	3.73	0.59	High	3.68	0.55	High
3. Cooperation Network	4.06	0.51	High	4.01	0.42	High
4. Organization Adaptation	3.90	0.62	High	3.94	0.52	High

The results of comparing the differences in managing the publishing industry business to changes of technology in the digital age, classified by the industry’s size, showed no statistically significant differences at the 0.05 level, both overall and in all four aspects.

Table 3 The statistical values used to compare the differences in the significance levels of the components in managing the publishing industry business to accommodate changes, categorized by the size of the industry.

Factor of Management of Publishing Industry Business to Support Change of Technology in The Digital Age	t-Value	ρ-Value
Overall level of importance of components	0.21	0.83
1. High-Tech Technology & Innovation	-0.48	0.63
2. Marketing Orientation	1.02	0.30
3. Cooperation Network	1.12	0.26
4. Organization Adaptation	-0.89	0.37

*Statistical difference at the level of 0.05.

The statistical values used to assess the goodness of fit of the structural equation model before modification indicated that the Chi-Square Probability Level (CMIN-ρ) was 0.000, the Chi-Square Ratio (CMIN/DF) was 4.420, the Goodness of Fit Index (GFI) was 0.433, and the Root Mean Square Error of Approximation (RMSEA) was 0.083. Unfortunately, none of these statistics met the criteria for a good fit with the empirical data. Consequently, the researcher proceeded to modify the model, considering Modification Indices values based on Arbuckle’s (2016) recommendations. Variables deemed inappropriate were individually removed, and the model was reprocessed iteratively until a model meeting all four goodness-of-fit criteria was achieved. Thus,

it can be considered that the structural equation model is complete and fits well with the empirical data.

The researchers used modification indices to improve the model and excluded unsuitable observed variables until the model passed all four statistical values, as shown in Table 3. After adjustment, the model showed that the chi-squared probability (CMIN- ρ) was 0.204, more significant than 0.05, indicating that the model is not statistically significant. Furthermore, the chi-square relative (CMIN/DF) value was 1.090, less than 2.00, indicating a good fit. Moreover, the GFI value was 0.966, more significant than 0.90, indicating a good fit. Finally, the root means a square value of the error estimate (RMSEA) was 0.013, less than 0.08. Therefore, it can be concluded that all four statistics met the evaluation criteria, indicating that the adjusted structural equation model for managing the publishing industry business to accommodate changes aligns well with the empirical data (Arbuckle, 2016)

Table 4 Model fit consideration statistics and output of before and after modification

Model Fit Consideration Statistics	Standard Criteria	Before Modification	After Modification
CMIN- ρ (Chi-square probability level)	Higher than 0.05	0.000	0.204
CMIN/DF (Relative Chi-square value)	Lower than 2.00	4.420	1.090
GFI (Goodness-of-fit-index)	Higher than 0.90	0.433	0.966
RMSEA (Root means the square error of approximation)	Lower than 0.08	0.083	0.013

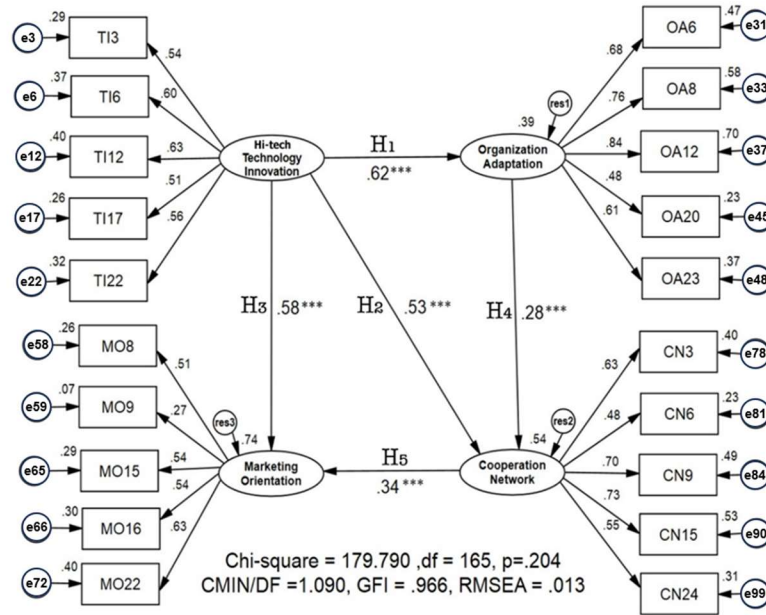


Figure 3: SEM model after modification
 Source: Prepared by authors (2023)

The results of the overall influence analysis, both direct and indirect influences of the structural equation model of managing the publishing industry business to support change, in Standardized Estimate mode after model modification. **Figure 3.**

Table 5 The statistical values for the analysis of overall influence, both direct and indirect influences of the structural equation model for the publishing industry business to support change of technology in the digital age, in Standardized Estimate mode after model modification.

Latent Variables	Hi-tech Technology & Innovation	Organization Adaptation	Cooperation Network	Marketing Orientation
Organization Adaptation	0.62	0.00	0.00	0.00
Cooperation Network	0.70	0.28	0.00	0.00
Marketing Orientation	0.82	0.10	0.34	0.00

The results of the overall influence analysis, both direct and indirect influences of the structural equation model for managing the publishing industry business to support change of technology in the digital age, in Standardized Estimate mode after model modification, reveal that the highest overall influence is on the Hi-tech Technology & Innovation component. It has the highest overall influence on the Marketing Orientation component, with a value of 0.82.

Conclusion and Discussion

Key findings from the research on management of publishing industry business to support change of technology in the digital age more efficient digital transformation include the following five points:

1. The research results comparing the components of management of the publishing industry business to support change of technology in the digital age in medium-sized and small-sized businesses with large-scale print media industry, there was no statistically significant difference at the 0.05 level, in line with the study by Piepponen et al. (2022). They explored the digital transformation of the publishing industry business, which is rapidly spreading in both medium-sized and small-sized businesses and large businesses, leading to digital changes in the publishing industry businesses of all sizes, including small, medium, and large. This result aligns with the research by Pamuji & Ida (2022), which found that medium-sized and small-sized publishing industry businesses and large ones adapted their business management to support digital transformation in the era of Industry 4.0. These changes were not significantly different. Furthermore, it is consistent with the findings of Mutiara & Priyonggo (2019) and Pamuji & Ida (2022) that innovation in the digital age presents various challenges to the survival of the publishing industry. The emergence of digital media, especially new online media, has posed challenges and threats to the traditional publishing industry business, particularly newspapers. Due to these obstacles and threats, some print media have closed, while others have shifted to digital systems, affecting the industry's new digital marketing approach, using extensive and cost-free social media platforms. This digital marketing approach has contributed to the success of the publishing industry business.

2. The results of hypothesis testing showed that the high-tech technology and innovation components directly influenced the marketing orientation aspect, with the highest overall standardized regression weight of 0.82. This research result indicates that the publishing industry must prioritize the development of cutting-edge technology and innovation to generate high revenue and profits. Replacing human labor with machinery, using advanced technology to reduce various costs and risks (Sukhawattanakun et al., 2023), and employing modern technology and innovation have yielded positive results in marketing under different circumstances. They broadened the market, instilled customer confidence in the business's quality, and expanded the customer base continuously. This result aligns with the research of Mutiara & Priyonggo (2019) and Pamuji & Ida (2022), which found that the challenges of digital innovation in the digital era in the publishing industry business, including the survival of the publishing industry business were significant. The rise of digital media, especially new online media, posed challenges and threats to traditional publishing industry businesses, particularly newspapers. Due to these obstacles and threats, some of the publishing industry businesses have closed, while others have shifted to digital systems, affecting the industry's new digital marketing approach, using extensive and cost-free social media platforms. This digital marketing approach has contributed to the success of the publishing industry business.

3. The results of hypothesis testing found that the components of high-tech technology and innovation directly influenced organizational adaptation, with the highest overall standardized regression weight of 0.85. This output indicates that in a world with significant changes, especially in the publishing industry business, which has been severely affected, organizations that do not adapt will continue to manage as usual. If the business uses the same old strategies, its performance will decrease and ultimately be forced to close due to changing circumstances. Therefore, organizations must adapt quickly and keep pace by relying on modern and relevant technology and innovation to survive in the face of substantial change. This result is consistent with the research by Kanokrat (2022), which found that strategies for adapting organizational management in the publishing industry to survive in the digital age must confront numerous challenges, especially regarding technology. Additionally, Sukhawatthanakun (2023) emphasized the importance of energized leadership, goal change, new work design strategies, and contemporary organizational structures that align with environmental factors and components. These are tools for efficiently managing organizational change during digital transformation.

4. Managing the publishing industry business to support change of technology in the digital age in high-tech technology and innovation has an average score of 4.06, the highest among all aspects. This result may be because, in the globalized era, technology is crucial for every private or public sector, especially for the publishing industry business, which fundamentally relies on good technology to stay competitive. Continuous innovation is necessary. Therefore, organizations that continue to use old equipment and tools without investing in new technology will not be able to compete with organizations that invest in new technology and innovation. This output is in line with the research by (Kritsan & Boonsom, 2021), which found that media industry entrepreneurs attach importance to digital changes. They utilize primary and valuable organizational resources, such as suitable technology, to improve and develop their work processes and continuously innovate, enabling the organization to have an efficient automated production technology system.

5. Managing the publishing industry business to support change of technology in the digital age in high-tech technology and innovation, the average score for designing an automatic printing head maintenance system, which allows for faster, more precise, and damage-free operation, is 4.36, the highest significance level. Customers demand high-quality, visually appealing, outstanding, sharp, and eye-catching work. If the publishing industry lacks quality, it will create a negative impression. Therefore, the publishing industry business must prioritize the quality of work as the top priority. Thus, it can be found that the design of maintenance systems for various equipment in the publishing industry business production must be taken seriously by management at all levels and relevant personnel. Maintaining machinery and equipment for excellent operation should align with the research by Mathai & Jeswani (2021), which studied the effectiveness of the publishing industry business marketing in the digital era of the Indian telecommunications industry. In the current digital age, businesses driven by the internet, which began with the evolution of the digital age, are entirely technologically advanced, providing convenience using automated technology.

6. From the results of the analysis of the relationship between variables in managing the publishing industry business to support change of technology in the digital age after the structural equation model was adjusted, it was found that the variable of rectifying losses in the pre-public release production process had the highest correlation with the variable of preparing monthly cash flow sources and used, with a correlation coefficient of 0.661. This result is consistent with the research by Benmas (2019), which emphasizes the importance of developing and improving the technology and information system department to increase efficiency in the publishing industry business production processes, reduce steps in the production process, and reduce losses in the publishing industry business production processes. It also aligns with the research by Mutiara & Priyonggo (2019), which found that digital changes in the publishing industry business, resulting from the cessation of information technology, have significantly reduced the revenue, customer base, and advertising revenue of newspapers.

Suggestions for next research

This research focuses on studying the management of publishing industry business to support change of technology in the digital age. Therefore, in future research, there are additional topics to consider, such as:

1. Structural Adaptation of the publishing industry business in the digital age: Given the integration of digital technology into organizational structures, it is essential for the publishing industry business to continuously adapt its organizational structure to remain aligned with its vision and current government policies.

2. Revenue Enhancement Strategies: Exploring revenue diversification strategies beyond the traditional publishing industry business should be a fundamental consideration to sustain the publishing industry business, including transitioning from a single media type to a diversified media business model and ultimately embracing media convergence to cater to niche markets.

3. Digital Media Platform Integration: Given the changing landscape of content creation in the digital age, the publishing industry should consider reshaping its content creation processes. Moreover, it involves linking platforms with digital media and developing the skills and expertise of personnel to keep up with contemporary technology.

These topics can further enhance our understanding of how the publishing industry business can successfully navigate the challenges and opportunities of the digital era.

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