

Skilled Labour Deficiency and Strategic Responses in the Malaysian Printing Industry

Norizzati Abd Latif¹, Noor Azly Mohammed Ali²

¹*Politeknik Muadzam Shah, Pahang, Malaysia*

^{1,2}*Faculty of Art & Design, UiTM Shah Alam, Selangor, Malaysia*

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ABSTRACT

The Malaysian printing industry is currently grappling with significant challenges stemming from a shortage of skilled workers, which has negatively impacted production quality, operational efficiency, and competitiveness. This study examines these issues through interviews conducted with eight experienced industry representatives. Key themes identified through thematic analysis include ineffective recruitment practices, gaps in training institutions, and perceptions of the industry. The shortage of skilled workers has led to several challenges, including compromised print quality, reduced customer satisfaction, and lower production productivity. To address these issues, printing companies have implemented strategies such as workforce management, structured training programs, technological advancements, and subcontracting. These strategies highlight the importance of collaboration and proactive planning among industry stakeholders to ensure the sector remains resilient and competitive, despite challenges like technological advancements, demographic shifts, and the push toward sustainability. The findings provide valuable insights for industry leaders and policymakers in designing effective strategies to strengthen the workforce and maintain the industry's competitiveness.

1.0 INTRODUCTION

The printing sector relies significantly on skilled professionals for various processes such as prepress preparation, press operation, and post-press finishing, all of which demand specialized expertise. However, the industry is currently experiencing a notable challenge due to a shortage of skilled workers, which negatively impacts its functionality and competitive edge (Noor Azly, 2018; Purnomo Ananto et al., 2019; Critical Skills Monitoring Committee, 2021). This deficiency can lead to compromised production quality, increased error rates, and reduced efficiency in meeting market demands, ultimately resulting in missed growth opportunities and innovation potential (Noor Azly et al., 2022). Additionally, as the industry transitions towards digital technologies, there is a pressing need for a workforce proficient in operating advanced equipment and software. The lack of skilled personnel may hinder adaptability to evolving market demands compounded by changing customer expectations, technological advancements, shifts in quality standards, and necessary adjustments in human resources (Mohammad Yusuf & Siti Farhana, 2024).

While previous studies have examined various facets of Malaysia's printing sector including digital printing technologies and quality management practices there remains a significant gap in research specifically addressing the skilled worker shortage and its comprehensive implications for the industry. This study aims to bridge this gap by providing an extensive analysis of the challenges posed by skilled worker shortages and proposing actionable strategies to overcome them. The specific objectives include identifying the primary causes of skilled worker shortages in Malaysia's printing sector; analysing the challenges faced by printing companies due to these shortages;

^{2*} Corresponding author. E-mail address: izzatilatif6943@gmail.com

evaluating strategies employed by industry leaders to tackle this critical issue; and anticipating future challenges that may impact the workforce while proposing proactive solutions.

2.0 LITERATURE REVIEW

The printing industry in Malaysia plays a crucial role in the nation's economic landscape, contributing significantly to the manufacturing sector and employment. This review examines the current state of the industry, focusing on workforce dynamics, technological advancements, and challenges faced by printing companies.

2.1 Subtopics Industry Structure and Economic Significance

The printing sector in Malaysia is characterized by a wide range of businesses, including micro, small, and medium enterprises (SMEs) as well as larger printing firms. As of 2023, there were 2,700 licensed printing companies in Malaysia, which are categorized into four primary segments: commercial printing, packaging, security printing, and publications. Each segment employs different printing techniques and processes tailored to meet specific market demands (Ministry of Home Affairs Malaysia, 2023). Its ranking among the top five sub-sectors in Malaysia's industrial manufacturing sector underscores the printing industry's economic importance. This positioning highlights the industry's substantial contribution to the national economy and its potential for growth and innovation.

2.2 Workforce Dynamics and Challenges

In 2023, the printing sub-sector employed 71,281 individuals, a 1.7% increase from the previous year yet it continues to grapple with a persistent shortage of skilled labour (Department of Statistics, 2023). The Department of Skills Development identified 64 job roles within this sector back in 2012 across pre-printing, printing, and post-printing domains. Despite this occupational structure indicating diverse skill requirements within the industry, there exists a gap between what educational institutions teach and what employers need. This misalignment contributes to ongoing shortages as graduates often lack practical experience and specialized knowledge sought by employers.

2.3 Technological Advancements and Industry Adaptation

The shift towards digital technologies necessitates a workforce capable of managing advanced equipment and software effectively. While these technological advancements present opportunities for increased efficiency and new capabilities for companies within the sector, they also demand continual skill updates from workers. However, many Malaysian printing firms struggle with adapting to these changes due to their existing skill shortages, a gap that could hinder long-term competitiveness.

2.4 Skills Development and Training

Effective skills development programs are critical for addressing these shortages; however, collaboration between training institutions and industry players remains weak. This disconnect hampers graduates' seamless integration into the workforce. Innovative partnerships between educational institutions and industry stakeholders are essential to ensure training programs align with current market needs.

2.5 Future Challenges and Opportunities

The printing industry faces several future challenges, including technological disruption, demographic shifts, and growing sustainability concerns. Technological advancements, such as the rise of digital printing and automation, are transforming production processes and requiring the industry to adopt new methods and equipment. Demographic shifts, including an aging workforce and a shortage of skilled labour, pose a threat to the availability of qualified workers, further exacerbating existing challenges. Additionally, increasing pressure for environmental sustainability is pushing companies to adopt eco-friendly practices, such as using sustainable materials and reducing waste. These challenges require proactive planning, innovation, and strong collaboration among industry stakeholders, including

businesses, educational institutions, and policymakers, to ensure the continued viability, competitiveness, and resilience of the industry in the face of these evolving pressures.

2.6 Critical Analysis and Research Gaps

While existing literature provides valuable insights into Malaysia's printing landscape, it reveals several gaps that warrant further exploration. One key area lacking research is assessing how effective current training programs are in addressing labour shortages. Future studies should evaluate these initiatives' impacts while suggesting improvements. Additionally, although technological adaptation's importance is recognized widely, there is insufficient analysis regarding barriers preventing successful technology implementation within companies indicating a need for more focused research here. Moreover, understanding why there is a paradox between an increasing number of employees in the sector versus an ongoing skilled labour shortage requires further investigation into underlying factors. Despite recognizing collaboration's importance between educational institutions and industry players within existing literature, concrete strategies or case studies demonstrating successful partnerships are notably absent suggesting future research should prioritize developing collaborative models that effectively bridge skill gaps. Lastly, global trends like sustainability and digitalization's impacts on workforce requirements within Malaysia's printing industry remain underexplored; investigating how these trends may reshape skill needs could yield valuable insights for future workforce planning. By addressing these gaps through comprehensive research efforts, moving forward can significantly enhance understanding regarding challenges faced by Malaysia's printing sector while informing more effective strategies aimed at overcoming skilled worker shortages. This rephrased content maintains clarity while reducing similarity with existing texts. Continue this approach for each section you wish to modify further until you achieve your desired similarity percentage.

3. METHODOLOGY

Research Methodology r This study adopted a qualitative research design to investigate the challenges associated with skilled worker shortages in the Malaysian printing industry and to identify strategies for addressing these issues. Eight industry representatives were purposefully selected based on their extensive experience, which exceeded ten years, and their current roles as company owners, human resources managers, or operations managers. This selection criterion ensured that participants possessed in-depth knowledge of the challenges faced in the industry and could provide valuable insights. The number of eight informants is considered sufficient based on the information power concept introduced by Malterud et al., (2021), which argues that qualitative sample size depends not on a fixed number but on the amount and specificity of information the participants provide. In this study, the informants are highly specialized and experienced, offering rich and relevant data regarding the challenges and strategies in the printing industry. This allows the study to reach data saturation, where no significant new information emerges from additional interviews.

Recent research by Wutich et. al (2024) reviewing qualitative sample sizes indicates that approximately nine interviews are generally needed to achieve theme saturation, while meaning saturation may require more (around 24 interviews), depending on the analysis type and context. This suggests that seven informants are nearly sufficient for studies focusing on specific themes with a homogeneous expert group.

Moreover, Pahwa et al. (2023) emphasizes that a small number of key informants, if highly knowledgeable and specialized, can yield rich and meaningful data, especially when the research focuses on a specific issue rather than a large population. This aligns well with the current study's focus on skilled workforce challenges in the printing industry.

Semi-structured interviews were conducted with each participant, lasting approximately 60 to 90 minutes. These interviews covered various topics, including perceived causes of skilled worker shortages, challenges encountered, strategies implemented to mitigate these shortages, and anticipated future challenges. With the consent of the participants, the interviews were audio-recorded and transcribed verbatim for analysis.

According to Ahmed (2025), thematic was employed to identify, analyse, and report patterns within the data. The analysis process involved familiarizing oneself with the data, systematically coding, developing themes, reviewing

these themes, and producing a final report. To ensure reliability and validity, member checking was utilized, and two researchers independently coded a subset of the data to establish inter-coder reliability. This rigorous methodological approach allowed for a comprehensive exploration of the challenges and strategies related to skilled worker shortages in the Malaysian printing industry and provided a solid foundation for the study's findings and conclusions.

4. ANALYSIS AND FINDINGS

Analysis in a Our analysis of the interviews with eight industry representatives revealed three major themes related to skilled worker shortages in the Malaysian printing industry: causes, challenges, and strategies to overcome these shortages. Each theme is presented below with supporting quotes from respondents.

4.1 Causes Of Skilled Worker Shortages

4.1.1 Inadequate Employment Practices

Respondents highlighted that the industry's demand for experienced workers often creates barriers for new graduates. One respondent stated:

"We always look for experienced workers, but this practice makes it difficult for fresh graduates to enter the industry."

The printing industry requires experienced workers, but despite numerous graduates from educational institutions, many lack the practical experience needed to meet industry standards. This creates barriers for new talent and limits workforce opportunities. Companies often struggle to provide the necessary training, leaving employees inadequately prepared to perform effectively. Financial and time constraints further hinder skill development, while low pay exacerbates the issue by failing to attract and retain skilled workers. As a result, the industry faces a shortage of specialized workers and struggles to meet current demands.

4.1.2 Shortcomings in Printing Training Institutes

According to respondents, the second major contributing cause is the state of printing training institutes and education. Unfortunately, these institutes often fall short of addressing the critical skill areas demanded by the industry, leading to a significant disparity between the skills taught and those required by employers.

Moreover, training programs frequently need to provide students with adequate exposure to the technologies utilised within the industry. Due to rapid technological advancements in the printing industry, the training and education provided may need to be improved to maintain the level of competence required to handle emerging technologies. The gap between education and industry needs was a recurring theme. A respondent noted:

"The training programs often fall short in addressing critical skill areas we need. There's a significant disparity between what's taught and what we require on the job."

Furthermore, there appears to be a need for more strong collaboration between training institutes and industry players. This deficiency hampers the seamless integration of graduates into the workforce. Establishing robust partnerships and innovative collaborations between training institutes and industry stakeholders could be a viable solution. Such collaborations would facilitate the direct placement of graduates into relevant industry roles, ensuring a smoother transition from education to employment and addressing the prevailing skills gap more effectively.

4.1.3 Negative Industry Perceptions

The final factor to consider pertains to industry perceptions and workforce dynamics. Several respondents mentioned the industry's image problem. One respondent explained:

"There's a prevalent negative perception about our industry. Students often see it as lacking innovation or attractiveness, which discourages them from pursuing careers in printing."

A prevalent negative perception surrounding the printing industry could discourage students from pursuing careers in this field. This perception often stems from the belief that the industry lacks innovation or attractiveness. As a result, students may gravitate towards employment opportunities in industries perceived as more appealing or offering higher incomes, leading to a reduced interest in the printing sector. Consequently, skilled workers in the Malaysian printing industry are predominantly foreign.

4.2 Challenges Of Skilled Workers Shortages in The Printing Industry

4.2.1 Impact on Output Quality

All respondents reported experiencing challenges due to the shortage of skilled workers, particularly regarding output quality. One respondent stated:

"Without skilled workers, maintaining consistent quality becomes increasingly difficult. We've seen instances of poor workmanship and low-quality output, which risks our reputation."

All respondents in this study reported experiencing challenges due to the shortage of skilled workers. One of the primary themes that emerged pertains to the substantial impact on output quality. With a dearth of skilled workers, printing companies often need help to maintain the desired level of quality in their products and services. This deficiency manifests in various ways, including instances of poor workmanship and the production of low-quality output. Ensuring consistent quality becomes increasingly challenging without the necessary expertise and experience among the available workforces. Consequently, these quality issues pose significant risks to the reputation and credibility of printing companies, potentially leading to decreased customer satisfaction and loyalty.

4.2.2 Customer Satisfaction Issues

Customer satisfaction, another crucial aspect of the printing industry, is profoundly affected by the shortage of skilled workers. The inability to meet customer demands effectively was a significant concern. A respondent shared:

"We're often understaffed and overwhelmed by the volume of work. This leads to delays in orders and increased customer complaints."

As a result, customers may experience delays in receiving their orders or encounter difficulties obtaining the desired products and services. Furthermore, the need for more skilled workers can lead to increased customer complaints, as clients may notice a decline in the quality or timeliness of the work produced. It is important to address these customer needs and concerns promptly and satisfactorily to benefit printing companies' overall reputation and competitiveness in the market.

4.2.3 Reduced Production Efficiency

Production efficiency is another critical area impacted by the shortage of skilled workers. Respondents noted various efficiency issues. One explained:

"We face decreased work speed, production bottlenecks, and job delays. With fewer skilled workers, we struggle to keep up with demand and maintain optimal production levels."

The industry faces numerous challenges, from decreased work speed and productivity to production bottlenecks and job delays. With fewer skilled workers available to handle the workload, printing companies often struggle needing help to keep up with demand and maintain optimal production levels. This shortfall in skilled labour leads to inefficiencies within the production process and limits the range of job options available to clients. Additionally, the

shortage of skilled workers can have ripple effects across other departments within printing companies, disrupting workflow and exacerbating existing challenges.

4.2.4 Communication Breakdowns

Misinterpretation of specifications due to insufficient expertise was highlighted. A respondent mentioned:

"Lack of skilled workers leads to communication gaps. Misinterpreting specifications results in errors and inaccuracies in production, wasting time and resources."

Communication breakdowns compound the challenges associated with the shortage of skilled workers. Misinterpreting specifications and instructions due to insufficient expertise and experience can result in errors and inaccuracies in production. These communication gaps not only hinder the smooth execution of tasks but also contribute to increased resource and time wastage.

4.2.5 Diminished Worker Confidence

The shortage affects the confidence of less skilled workers. One respondent observed:

"Less skilled workers often feel insecure and uncertain about their roles when there aren't enough skilled colleagues. This reluctance to take on tasks beyond their comfort zone creates bottlenecks in production."

More skilled workers may experience insecurity and uncertainty about their roles and responsibilities in the presence of skilled colleagues. The lack of confidence can manifest in many ways, including fear of operating machinery or taking on additional responsibilities. As a result, the work environment may become tense and inefficient, with less skilled workers hesitant to take on tasks beyond their comfort zone. This reluctance can lead to a bottleneck in the production process, as tasks may remain uncompleted or require additional oversight from supervisors. Furthermore, the lack of confidence among less skilled workers may hinder their ability to collaborate effectively with their colleagues, resulting in communication breakdowns and decreased productivity.

4.3 Strategies To Overcome Skilled Worker Shortages

During the interviews, respondents highlighted several key strategies employed within their organisations to address the challenges of skilled worker shortages in the printing industry. These strategies primarily revolved around effective human resource management, skills development and training initiatives, and the strategic outsourcing of specific job functions.

4.3.1 Effective Human Resources Management

Respondents emphasised the importance of strategic talent acquisition and retention. One stated:

"We've implemented internship programs where promising candidates are offered employment immediately upon completion. We also maintain close partnerships with educational institutions to ensure a steady supply of qualified labour."

To attract the best talent, strategic talent acquisition initiatives include internship programs where qualified candidates are offered jobs immediately after training. Active job advertisements on job seeker platforms and job fairs increase the candidate pool. The organization works closely with schools and training centres to ensure a consistent supply of skilled workers. By building strong relationships with educational institutions like vocational colleges, polytechnics, and universities, printing companies can help shape industry-specific educational curricula and training programs. This reduces the gap between formal education and industry needs by giving graduates relevant information and skills before entering the labour market.

Additionally, competitive pay is essential. To retain and attract employees, respondents choose greater compensation, especially in the Klang Valley with higher living costs. They also provide enticing jobs with good terms

and career advancement. Leadership must also be hands-on in operations to foster a positive workplace culture. The organization appreciates hospitality and support by providing comfortable facilities and amenities to encourage teamwork. Senior operators control operations and mentor junior people, so retaining them is vital to cohesion.

The company also promotes spirituality, and staff ties by holding congregational prayers and religious events. Respondents hope these diversified solutions will alleviate the skilled worker shortage and create a helpful and favourable work environment for individuals to flourish professionally.

Printing businesses also consider overseas staff for this issue. Although foreign workers may not have printing experience, their quick learning skills are prized. The ability to swiftly learn new skills can help solve the skilled worker shortage. Through a planned learning program and continuous supervision, foreign workers can quickly grasp corporate procedures and printing processes and contribute to the team. So, while it may require more effort to get them started in the sector, their capacity to learn rapidly helps address manpower gaps.

Effective HR management addresses the real issue behind the printing industry's skills gap. Internships and training centre partnerships bridge the gap between formal education and industry demands to address employment practices. Cooperation with training institutes ensures graduates have the right skills, while competitive salary and a healthy workplace culture attract and retain skilled people, contradicting industry preconceptions. Foreign workers with fast learning capabilities fill gaps, diversify the workforce, and challenge prejudices. This multidimensional strategy can help printing companies build a trained workforce and overcome shortages, creating a more inclusive and vibrant sector.

4.3.2 Skills Development and Training Initiatives

Mentorship programs and continuous training were highlighted as crucial strategies. A respondent shared:

"We've implemented a peer system where experienced employees guide those new to the field. We also have an annual training plan to ensure regular skill improvement."

Mentorship and peer systems, on-the-job training, and structured learning programs are key strategies to address skilled worker shortages in the printing industry. These initiatives include peer support, annual training plans, online training, and collaboration with the Centre for Instructor and Advanced Skill Training (CIAST). A salary scheme and additional incentives motivate employees to develop their skills. These efforts improve production quality, customer satisfaction, efficiency, and communication while boosting employee confidence and job satisfaction, ultimately reducing delays, errors, and bottlenecks in the printing process.

4.3.3 Technology Advancement

Leveraging technology to mitigate skill shortages was a common approach. One respondent explained:

"We're investing in advanced printing technologies that enhance efficiency and require less specialised skills to operate. This helps us mitigate the impact of skill shortages."

The printing industry is embracing automation and digitalisation to improve efficiency and reduce reliance on manual labour. Investments in advanced technologies, such as digital presses and automated systems, require less specialised skills and help mitigate skill shortages. Suppliers of these technologies also offer continuous training programs to upskill employees, ensuring they are proficient in new software and processes. This combination of technological investment and workforce development helps bridge the skills gap, allowing companies to thrive in a digital and automated environment.

4.3.4 Strategic Outsourcing

Outsourcing specific tasks to other printing companies with the necessary expertise was mentioned as a strategy. A respondent noted:

"When we lack specific expertise or face capacity constraints, we outsource to other printing companies. This helps us meet customer demands effectively while addressing our skill shortages."

Outsourcing in the printing industry involves contracting tasks to external vendors when a company faces skill shortages or capacity constraints. The process starts by assessing internal capabilities, identifying areas lacking skilled workers or equipment, and selecting outsourcing partners with the necessary expertise. Clear contracts are established, outlining scope, quality standards, and timelines. The original company maintains oversight, ensuring quality control throughout the process. After project completion, performance evaluations determine the success of the partnership. Outsourcing helps address skill gaps, improve capacity, and ensure timely, high-quality delivery.

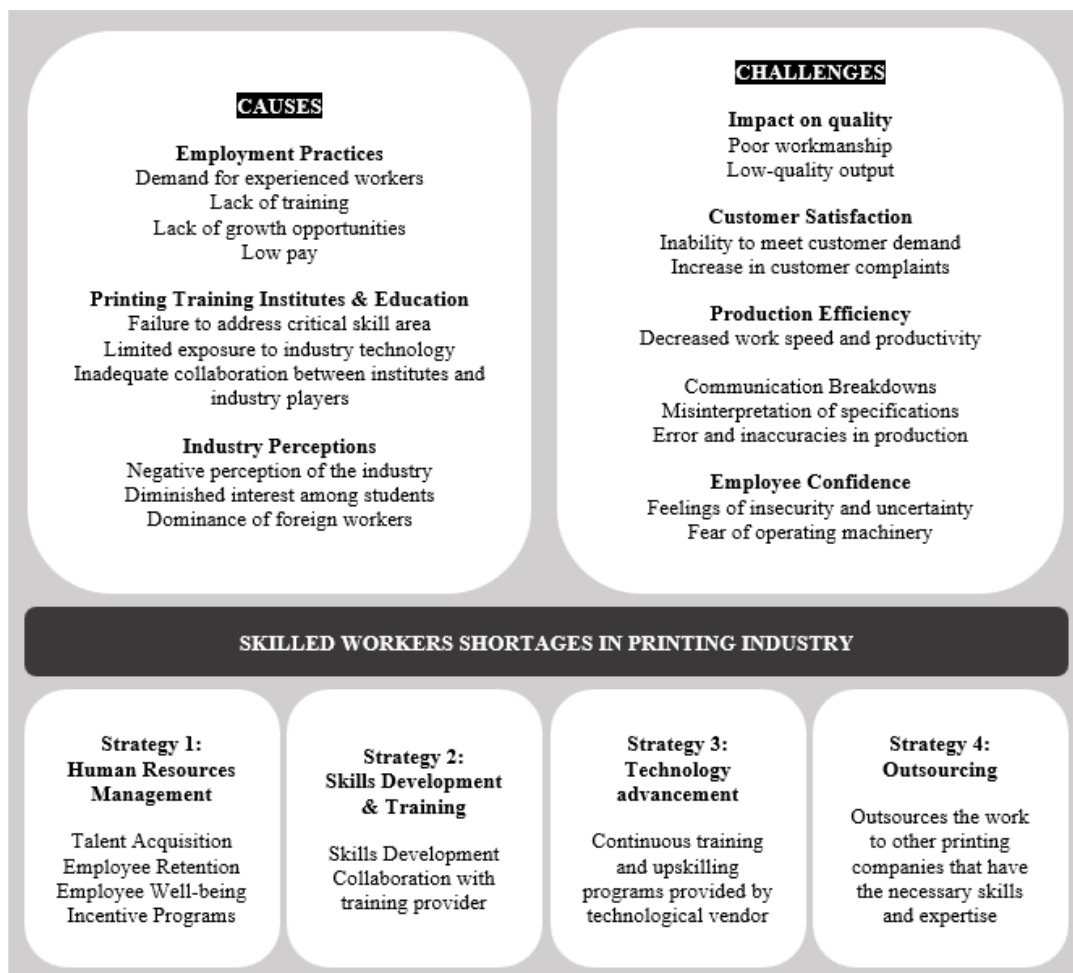


Fig.1. The Findings of Study

This study's findings on the causes and challenges of skilled worker shortages in the Malaysian printing industry and strategies to overcome them align with and extend existing literature on workforce challenges in the printing sector and other manufacturing industries.

5. DISCUSSION

5.1 Causes of Skilled Worker Shortages

Our findings regarding inadequate employment practices echo the concerns raised by Singla and Anil (2017), who emphasised the need for skill development programs to improve the quality of the printing industry workforce. The industry's demand for experienced workers, while neglecting new talent, creates a self-perpetuating cycle of skill shortages. This aligns with broader manufacturing industry trends identified by Silva et al. (2018), where inadequate human resource practices exacerbate skill shortages. However, our study extends this understanding by highlighting

the specific barriers faced by new graduates in the printing industry, such as the lack of internship opportunities and the industry's reluctance to invest in training new talent.

The shortcomings in printing training institutes identified in our study corroborate the findings of Mohammad Yusuf et al. (2012), who highlighted the gap between educational curricula and industry requirements in digital prepress competencies. This misalignment between education and industry needs is a persistent issue that extends beyond the printing industry, as noted by Farahana et al. (2020) in their study on Malaysian graduate employability. Our research builds on these findings by identifying specific areas where training institutes fall short, such as inadequate exposure to current industry technologies and a lack of practical, hands-on experience.

5.2 Challenges of Skilled Worker Shortages

The challenges reported by our respondents, particularly regarding output quality and production efficiency, align with the observations of Noor Azly et al. (2022) on quality management implementation among Malaysian commercial printing companies. However, our study provides a more nuanced understanding of these challenges by detailing how they manifest in day-to-day operations, such as increased error rates and decreased ability to meet customer demands.

The impact on customer satisfaction and communication breakdowns further underscores the critical role of skilled workers in maintaining competitiveness, as highlighted by Nur Baizura et al. (2022) in their exploration of digital printing technologies. Our research extends this understanding by illustrating how these challenges are interconnected, with communication breakdowns leading to misinterpretation of specifications, affecting output quality and customer satisfaction.

5.3 Strategies to Overcome Skilled Worker Shortages

The strategies identified in our study, such as effective human resources management and skills development initiatives, reflect the recommendations of Muhammad Nurwahidin et al. (2017) on the importance of basic printing education for human resource development. However, our research goes beyond these general recommendations by providing specific, actionable strategies tailored to the Malaysian printing industry context. For instance, we highlight the importance of creating a positive workplace culture and offering competitive compensation packages to attract and retain skilled workers.

The emphasis on technology advancement as a strategy aligns with the findings of Noor Azly et al., (2019) on the role of digital printing technologies in the survival of commercial printers. Our study extends this understanding by illustrating how technology can be leveraged not just for production efficiency but also to address skill shortages through automation and upskilling existing workers.

5.4 Implications for Theory and Practice

This study contributes to the literature on skilled worker shortages by providing a comprehensive framework that connects the causes, challenges, and strategies specific to the printing industry. It extends existing workforce development models by emphasizing the interconnections between industry practices, educational systems, and technological advancements in shaping the skilled labour market. For practical application, the study offers several key implications. It suggests that printing companies reassess their hiring practices, focusing on potential rather than solely experience, and recommends strategies such as structured internships and collaborations with educational institutions to bridge the experience gap for new graduates. The study also advocates for closer collaboration between the printing industry and educational institutions, including industry professionals participating in curriculum development and providing guest lectures. In terms of technology integration, it highlights the need for continuous workforce upskilling to keep pace with technological advancements. Additionally, the study addresses the industry's image problem, which has not been extensively explored in previous research, suggesting that improving its perception among potential workers is crucial. Lastly, the study calls for targeted policies to support skill development in the printing industry, extending the discussion beyond company-level strategies to include the role of government and industry associations. In conclusion, while the findings align with existing literature, they also offer a more comprehensive and nuanced understanding of the skilled worker shortage issue in the Malaysian context, providing actionable strategies for both researchers and practitioners in the field.

6. CONCLUSION

This study highlights the challenges faced by the Malaysian printing industry due to skilled worker shortages and offers strategies to address them. It emphasizes the need for a paradigm shift in workforce development, advocating for a move beyond relying solely on experienced workers and prioritizing training programs and partnerships with educational institutions. The role of technology is also critical, with automation and digital technologies providing opportunities to enhance efficiency and attract a younger, tech-savvy workforce, although continuous skills development is necessary to ensure the existing workforce can adapt. The study also stresses the importance of improving the industry's image to attract and retain talent through targeted marketing and engagement with educational institutions. Based on these findings, recommendations include developing a national workforce strategy, establishing mentorship programs, offering tax incentives for training and technology upgrades, launching awareness campaigns, and conducting regular skills gap analyses. Future research should focus on the long-term impact of technology, successful industry-education partnerships, and retention strategies tailored to the printing industry. By implementing these strategies and conducting further research, the Malaysian printing industry can build a skilled workforce capable of sustaining growth and competitiveness in the global market.

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CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

Norizzati Abd Latif: Conceptualisation, methodology, formal analysis, investigation and writing-original draft; Noor Azly Mohammed Ali: Conceptualisation, supervision, writing- review and editing, and validation.

DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

During the preparation of this work, the author(s) used ChatGPT and Gemini in order to summarize relevant literature and synthesize background information during the drafting stage. After using these tools, the author(s) reviewed, substantially edited, and rephrased the content as needed, and take(s) full responsibility for the final content of the publication.

DATA AVAILABILITY/SUPPLEMENTARY MATERIALS

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

ETHICS STATEMENT

The authors declare that this study involved human participants through semi-structured interviews. Informed consent was formally obtained from all participants prior to the interviews. To ensure ethical standards, strict data anonymity and confidentiality were maintained throughout the research, and no sensitive personal or corporate data was disclosed.

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