

JPMTR-2225
DOI 10.14622/JPMTR-2225
UDC 651.1(595):614.4:338.3

Case study | 175
Received: 2022-10-24
Accepted: 2023-03-16

The health and outlook of printing industry post-Covid-19: the insight into Malaysia printing industry

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Abstract

While it is widely assumed that the printing industry is in a state of declining demand, or “sunsetting” worldwide, our study suggests that the printing industry in Malaysia shows a stabilizing trend. Print service providers (PSPs) diversify and exploit the trend for digitization and automation and also explore new market segments to stay relevant. The industry’s performance before, during, and after the pandemic from 2019 to Q2 2022 was analyzed. An interview with the top management of PSPs was conducted to obtain views on the impact of Covid-19 on the print business. The findings show macroeconomic factors’ are heavily influenced by growth and suggest that demand will remain resilient going forward, making the outlook for the printing industry optimistic despite domestic and global uncertainty. We also discovered that the pandemic has given PSPs a chance to reevaluate their operations and rebuild using technology to support their businesses in the post-Covid-19.

Keywords: printing industry market, industry performance, developing nations, digitalization, pandemic

1. Introduction and background

Printing is one of the oldest industries in Malaysia and its emergence can be traced back to 1806. On March 1st of that year, following the arrival of Malaysia’s first printing press, the daily Government Gazette, under the direction of A.B. Bone, had its inaugural run in Penang (Byrd, 1970). The industry continued to develop, and by the late 1880s the growing presence of printing machinery and equipment saw printing establishments expand to include not only European printers, but local and regional ones as well, such as Chinese, Indian, Jawi Peranakan/Jawi Pekan and the Malay (Harun, 2005). According to Harun (2005), Penang became the center of the printing industry at that time and has remained so to this day. To illustrate, since World War Two more than 20 printing establishments have been set up shop in Penang and contributed to the rise of various industries such as newspaper, magazine, and book presses throughout Malaysia.

More importantly, printing industry’s contributions to Malaysia’s development extend beyond media. Printing serves as a medium of communication, for protection of goods in packaging and in the art products. Printing industry has a significant impact on business opera-

tions and management in every sector of the national economy (Mtshali, et al., 2018; Rocha, 2019; Mohamad, 2003). Printing sector has offered a wider range of services and is more productive due to the development of technology. The major workforce has switched from craftsmen to technologists as a result of process automation.

The Covid-19 pandemic has a significant influence on most businesses, including the printing industry. However, it has varying impacts on the printing industry based on the sectors and print products. A market report on disrupting of Covid-19 on printing industry shows that publication markets will be most affected, followed by graphics, packaging and labels (Smithers, 2021). Gamprellis, et al. (2021) have studied the challenges for the printing industry in the modern digital and meta-pandemic era. The study concluded that even though the pandemic of Covid-19 has had a huge impact in terms of the financial crisis, the impact on the printing industry is not severe.

The printing industry has demonstrated a stabilizing trend in which label or packaging printing is obviously rising and even growing at extremely high rates. An interesting finding in the brewing industry has shown

that the increase in at-home consumption has a positive impact on packaging printing. Packaging became an important tool to the brewing industry as single serving packages became the most important form of packaging during the Covid-19 pandemic (Pitts and Witrick, 2021). The impact of Covid-19 on food sector has also contributed to a positive dimension for packaging sector in the printing industry. Innovation such as smart packaging, advanced traceability systems, new biosecurity arrangements to protect consumers by ensuring the food and food supply chain's safety and reduce food loss and the environmental impact of the food sector has helped the packaging sector (Galanakis, et al., 2021).

An overview of the European packaging industry due to the pandemic of Covid-19 has shown a significant increase in demand for packaging products in the food and pharmaceutical industry and e-commerce (Naletina, 2021). As of yet, no study has focused on the current state of the Malaysian printing industry during the post pandemic of Covid-19. Existing studies tend to simply presume that commercial and publication print revenues have fallen due to Covid-19 (McNulty, 2020; Brinton, 2021; Gamprellis, et al., 2021; Sheresheva, et al., 2021).

With this gap in mind, the goal of the present study is to investigate the current state of the Malaysian printing industry; post pandemic by looking at industry's performance before, during and after the pandemic period using a time-series analysis. For this purpose, two research questions were proposed:

RQ 1: How has the Malaysian printing industry performed from 2019 to the second quarter of 2022?

RQ 2: What impacts has Covid-19 had on print service providers (PSPs); how have they dealt with these and what have they learned during the pandemic?

To answer these questions, we studied macroeconomic data from the Department of Statistics Malaysia and applied a qualitative approach using the multiple case study method. This allowed us to scrutinize the PSPs' experiences and challenges and to offer a prognosis for the future of the printing industry. In so doing, we hope to make this research a potential source for industry competitiveness studies both for the printing industry and other industries that are prone to disruption by digital innovation such as the retail sector and travel agents (Thomas and Douglas, 2021).

We are confident the present study raises the possibility of improving existing policies and encouraging better policies and programs by the government, policymakers, and printers themselves.

2. Methodology

For the first research question, we studied the performance of the printing industry by looking at the statistics published by the Department of Statistics Malaysia, namely the printing industry's contribution to Malaysia's gross domestic product (GDP). According to Callen (2020), GDP – the total value of all goods and services produced in a certain period after deducting the costs of goods and services used up in the process of production – is one of the most widely used indicators of economic performance. Data from the national production and expenditure accounts for the second quarter of 2022 contain statistics of quarterly national accounts (Malaysia's Official Statistics, 2022) estimates by economic activity and expenditure type in both current and constant prices set at base year 2015.

The three-year period in the data allows for an analysis of the changing global business environment, particularly as globalisation forces, trade liberalisation and political reforms in other countries have facilitated accelerated trade and growth, which is especially significant for fast-changing, emerging economies such as Malaysia's. The major advantage of a time-series analysis is that it encompasses a set of sequential quantitative observations to identify dynamic capabilities and superior performance over time based on patterns in the historical data (Kirchgässner, Wolters and Hassler, 2012). This time-series analysis has been used in the past in the field of econometrics, further supporting its validity (Mugableh, 2015; Linton, 2017).

Looking specifically at factors that drive the printing industry and potentially determine its growth, we pay special attention to advertising and promotion expenditures; that is, we study the trends in Malaysia's advertising and promotion expenditures by medium in the years 2020 and 2021.

To answer the second research question, a multiple-case-studies design was used to explore the data related to Covid-19 and its relation to PSPs. According to Bengtsson (2016), the concept of unit of analysis refers to the sample that can best answer the queries set out in the study's aim. In this study, the unit of analysis is a PSP in Malaysia's print industry, in other words, the individual. The target respondents in this study were those who hold top managerial positions (i.e. managing directors / business managers) and who are therefore directly involved in decision making and the direction of their businesses. We collected PSP managers' opinions on the impact of Covid-19 on the print business through semi-structured interviews, which, we believe, allows us to capture the complexities of the pandemic and facilitate further investigation.

3. Data analysis

To address the first research question, descriptive statistics were used to describe and summarize the data and to present meaningful information about the performance of the printing industry over time. As such the analysis is presented in a time series of quarter 1 (January to March), quarter 2 (April to June), quarter 3 (July to September) and quarter 4 (October to December).

Due to data availability limitations regarding Malaysia's GDP, only the first and second quarters of 2022 are presented (Malaysia's Official Statistics, 2022). Nevertheless, the findings of this research could be considered beneficial because they reflect the pre-pandemic, pandemic and post-pandemic situations in Malaysia.

To ensure the reliability and validity of the data, statisticians at the Department of Statistics Malaysia were consulted if any uncertainty in the data arose during data validation checks. Furthermore, to assist in the analysis and to check the consistency of the data, an independent statistician was employed.

3.1 Selection of participants for case studies

The target participants for the multiple case studies comprised print PSPs in the Klang Valley and the Selangor area (central Malaysia). The sampling approach started by consulting the Yellow Pages Business Directory 2021/2022, which was published by TM Info-Media Sdn. Bhd. The Yellow Pages was selected due to its reputation as a leading business directory in Malaysia since its establishment in 1989. Furthermore, it lists 500 000 businesses and digital platforms for easy searching (Yellow Pages Malaysia, 2022). After searching for a list of PSPs, we filtered the results to include only the manufacturing category, leaving us with 243 listings. Then, for each PSP we consulted the database of the Companies Commission of Malaysia to validate the profile of each company and/or business, and then further consulted with the Malaysia Printers Association, the Malay Printing Entrepreneurs Association of Malaysia and the Selangor & Federal Territory Chinese Printing Presses Association for their feedback as to how to best approach the top managers of selected PSPs, thus reinforcing our understanding of our interviewees.

Subsequently, the top managers with experience and knowledge of doing business during Covid-19 were selected based on purposeful sampling (Creswell and Piano Clark, 2017; Patton, 2002). The function of purposeful sampling is to capture the characteristics of both commonalities and differences that are neces-

sary for producing new knowledge (Palinkas, et al., 2015). Moreover, as reliability and validity of samples are based on availability, willingness and the ability to participate, communicate and share experiences in a reflective manner, candidates in top managerial positions were perceived as the most appropriate because they are directly involved in decision making and the direction of their businesses (Bernard, 2006). A major advantage of this qualitative method is its ability to provide a deeper understanding of the phenomenon under study. This sampling method particularly aims for efficiency and validity (Morse, 2009) with an emphasis on saturation (Miles and Huberman, 1994), whereby we achieve a thorough understanding by sampling continuously until no new significant information is obtained. With this in mind, we restricted the interviews to five Malaysian PSPs at top management levels.

The study was conducted in accordance with proper protocols. Interview sessions adhered to social distancing protocols, and Certificate of Ethics was issued by the Research Ethics Committee of Universiti Teknologi MARA (UiTM). Face-to-face interviews were conducted with the purpose of eliciting information from study participants, all of whom provided consent in written form to participate.

The minutes from each interview were transcribed and then codified using the NVivo software. Key phrases were coded and a tree structure was developed to facilitate the analysis that helped us organize it into an analytical theme.

4. Findings

Firstly, we discuss the performance of Malaysia's printing industry. Next, we consider the impact and challenges faced by PSPs in conducting their businesses during the Covid-19 period. Finally, we describe the insights gained from these PSPs' experiences during the pandemic.

4.1 RQ 1: How has the Malaysian printing industry performed from 2019 to the second quarter of 2022?

The growth of the Malaysian printing industry from 2019 to Q2 of 2022 is illustrated in Figure 1.

In 2019, Malaysia's economy grew by 4.3 %. Similarly, Malaysia's printing industry grew by 4.2 % despite political uncertainty and external conditions (World Bank, 2019). However, some printers experienced delays in government related print projects, particularly textbooks.

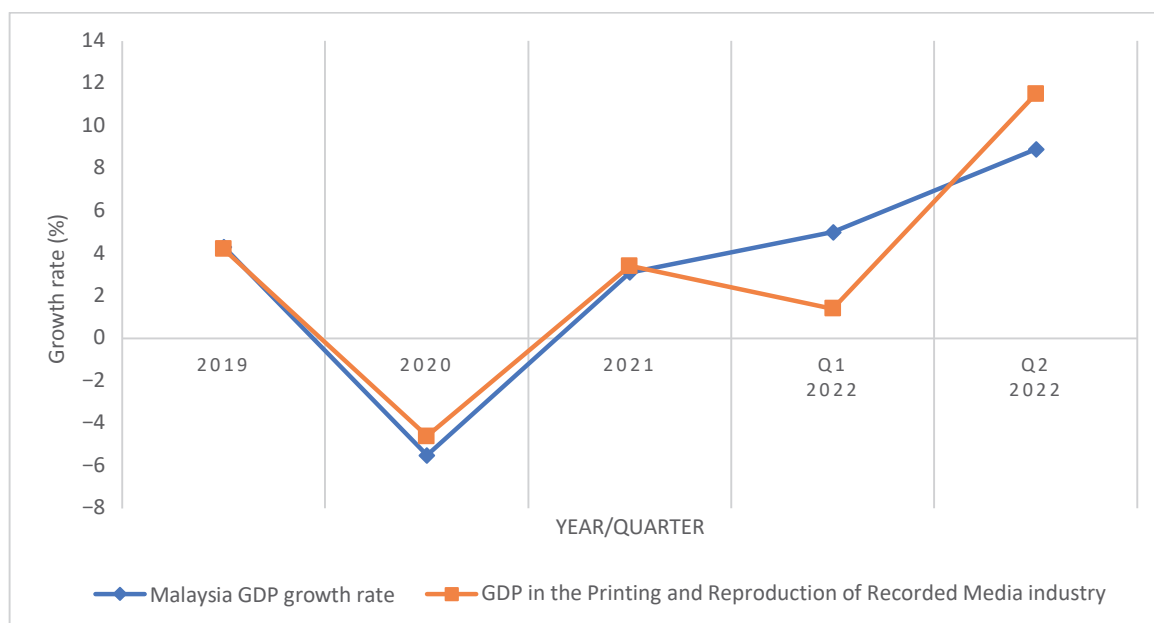


Figure 1: Percentage GDP change in the Printing Industry and Malaysia's GDP

The following year, Malaysia experienced the sharpest recession in twenty years with a recorded -5.5% negative growth. This negative growth was a direct result of the health impact of the pandemic, the restrictions on movement, and the global recession (which directly impacted Malaysia's trade sectors). This triple shock likewise contributed to the -4.6% negative growth of the Malaysian printing industry. Domestically, the decline was largely due to a decrease in demand for print materials among Malaysian consumers, which, in turn, may be due to the fact that the pandemic brought about a change in lifestyle among Malaysians. For example, the education sector in particular saw a fall in demand for published items as a result of the government's enforcement of the Movement Control Order (MCO). The temporary closures of public and private educational institutions across the county persuaded educators to utilize virtual learning platforms, including electronic books (e-books), videos, apps and online quizzes and tests (Sim, Sim and Quah, 2021), thereby decreasing the need for printed reading materials.

The pandemic also changed the way Malaysians consume information; for example, the lockdown led Malaysians to increasingly rely on alternative media sources. The same is true of advertising and promotions. During the pandemic, many businesses turned to alternative media, such as the internet, to promote their products and services. This is evidenced by comparing the change in Malaysia's advertising expenditures (ADEX) in 2021 and 2020 (see Figure 2). As reported by the Malaysia Advertisers Association (2021), internet advertising saw a significant increase of 37% , including on the digital out of home (DOOH) platform. TV and

radio advertising recorded increases of 12% and 4% , respectively, while outdoor banner advertising recorded the lowest increase of 0.6% . Overall, ADEX by print medium decreased by 29% for magazines, and 8% for newspapers (Malaysia Advertisers Association, 2021).

A closer inspection of ADEX in Figure 3 shows year-on-year growth, but reveals a significant decline in newspaper ADEX from 42% in 2012 to 7% in 2022. Similar but less pronounced trends can be seen with magazine ADEX, from 7% in 2012 to 4% in 2022. There is thus a clear trend of decreasing demand for print media advertising.

Moreover, the shift in consumer culture was not limited to individuals. The decline in demand in 2020 was also a result of the accelerated trend towards a paperless economy brought on by many companies and government offices adapting to the lockdown, forcing them to transition to home offices. This is particularly evident by reports by some printers that orders for stationary items such as envelopes, business cards, letterheads, and binders were significantly lower. It is surprising, then, that the negative growth of the printing industry was not as substantial as the overall economy in 2020.

That being said, a counterbalancing increase in demand in 2020 was driven by packaging and labels, especially for essential products such as medical supplies, particularly face masks and rubber gloves. Furthermore, the accelerated growth of e-commerce led to an increased demand for corrugated cartons and flexible packaging as more businesses leveraged digital platforms rather than conventional retail outlets.

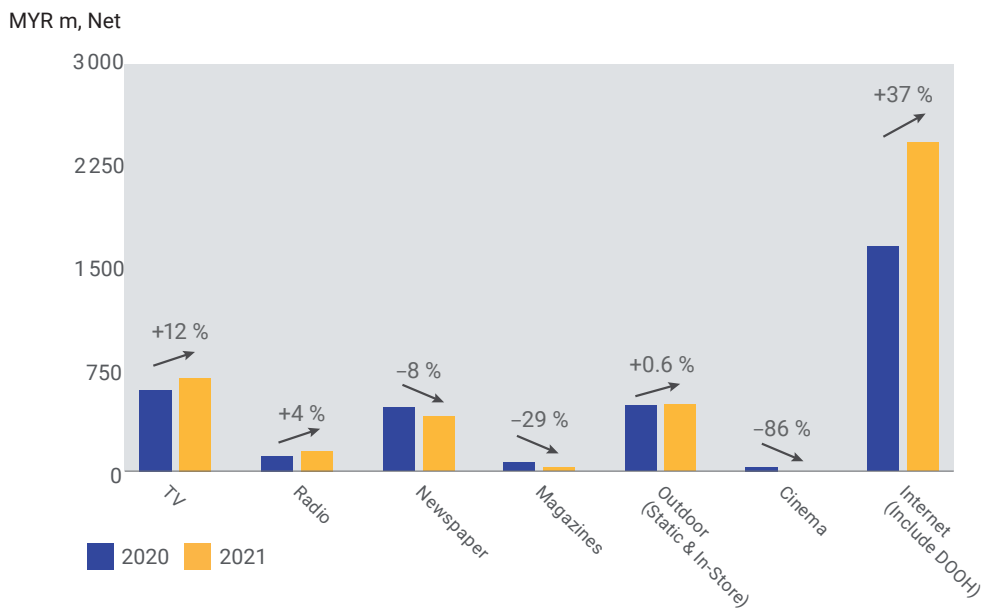


Figure 2: Total advertising expenditures (ADEX) by medium for the years 2020 and 2021 (Malaysia Advertisers Association, 2021)

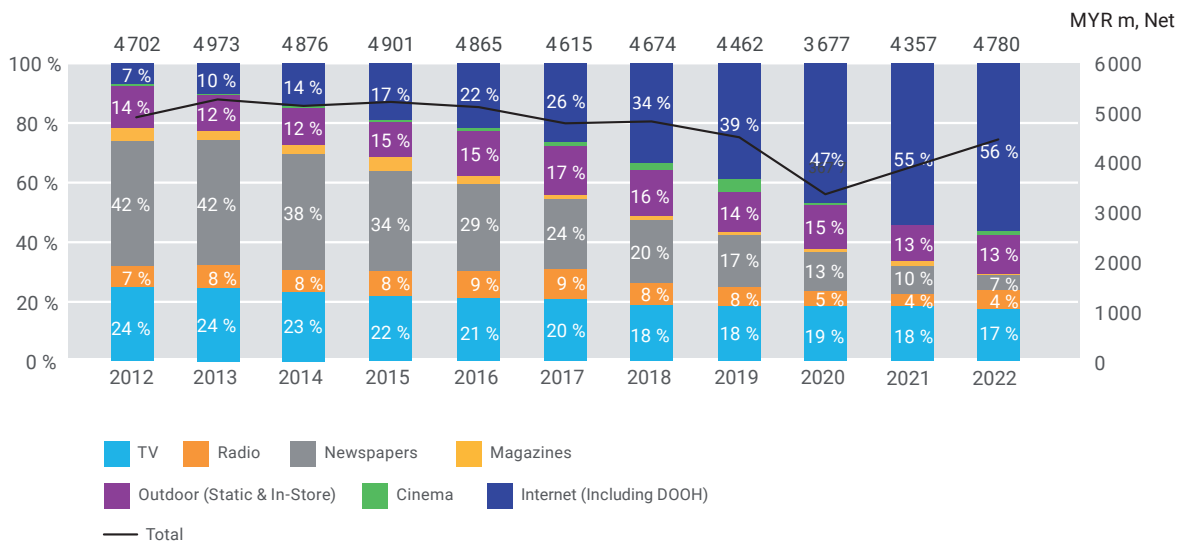


Figure 3: Advertising expenditures by medium in % and in total in million MYR – multi-year growth (Malaysia Advertisers Association, 2021)

In 2021, economic conditions began to change. The country witnessed a slow recovery from Covid-19 starting in Q3, with the number of new daily cases continuing its downward trend while recoveries showed an upward trend. With 74.9 % of the population fully vaccinated, the withdrawal of restrictions on travel and business operation hours increased economic and social activities. From the data in Figure 1, it is apparent that this had a positive influence on Malaysia’s economy with a recorded positive growth of 3.1 %. Figure 1 likewise illustrates that the Malaysian printing indus-

try performed relatively well in 2021 with a higher growth of 3.4 % as compared with 2020 (-4.6 %). As a whole, the relaxed Covid-19 restrictions allowed Malaysia’s manufacturing sectors to post stable growth data supported by domestic and external recovery in demand (Malaysia’s Official Statistics, 2021).

With all 13 states in Malaysia showing positive growth of 3.1 % in 2021, compared to a decline of -5.5 % in 2020, Malaysia’s economy was projecting a clear sign of recovery momentum despite projections of decline

in the global economy to 2.9 % in 2022 (World Bank, 2022). In fact, in Q1 2022, Malaysia’s economy had a strong growth of 5 %. However, as shown in Figure 1, the Malaysian printing sector recorded a slower recovery of just 1.4 % in the same quarter despite the move out of the pandemic phase. In contrast, in Q2 2022, while Malaysia’s economy rose to 8.9 %, the printing industry, which accounts for just 0.3 % of total GDP, performed at a record growth of 11.5 %. This performance was underpinned by both the intensifying demand for products associated with Malaysian social events, such as the Eid al-Fitr celebrations, and the reduced restrictions on individuals and businesses. It is expected that the manufacturing sector as a whole will remain strong in the following months due to the continued increase in demand as well as the global economic recovery.

4.2 RQ2: What impacts has Covid-19 had on print service providers (PSPs), how have they dealt with these and what have they learned during the pandemic?

This part of the paper answers the previously presented research questions regarding how Malaysian printers overcame Covid-19-related issues and how their actions have helped them plan for changes in Malaysia’s print industry going forward (RQ2).

We summarize our findings of interviewees’ characteristics in Table 1. It is notable that all of our PSPs have more than 15 years’ experience in the printing business.

To address the second research question, we first explored the impact of Covid-19 on printing businesses (Figure 4).

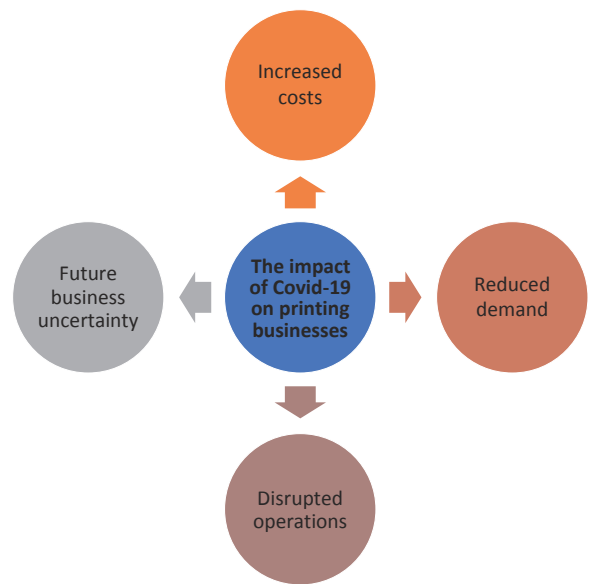


Figure 4: The impact of Covid-19 on printing businesses

Next, we highlighted the strategic management approaches adopted by the PSP during the crisis (Figure 5). Finally we recorded PSPs’ perspectives on the future of printing (Figure 6).

Table 1: Characteristics of interviewees and their firms

ID (Company)	Designation ^a	Year incorporated	Sales turnover ^b <RM15 million, ≤ RM50 million	Area of specialization ^c	Technologies ^d
A	Managing Director	1975	≤ RM50 million	Manufacturing of diaries, notebooks and paper stationaries- related products	Offset and gravure printing
B	Managing Director	1984	≤ RM50 million	Book printing, binding, finishing and logistic fulfillments	Offset and flexography printing
C	Managing Director	1993	≤ RM50 million	Paper based packaging	Offset printing
D	Business Manager	2006	< RM15 million	Design services, commercial and publication printing	Event production and digital printing
E	Managing Director	2001	< RM15 million	Business process outsourcing	Digital and variable data printing and mailing

^a This column lists the interviewees’ roles within the firms.

^b This column represents the size of the PSP’s operation as defined by SME Corp. Malaysia (2020).

^c This column represents the area of specialization based on product segmentation.

^d This column lists the main printing technologies used by the firm.

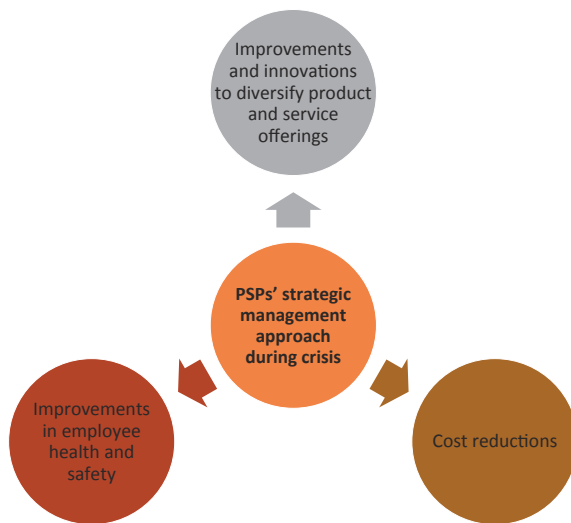


Figure 5: PSPs' strategic management during crisis

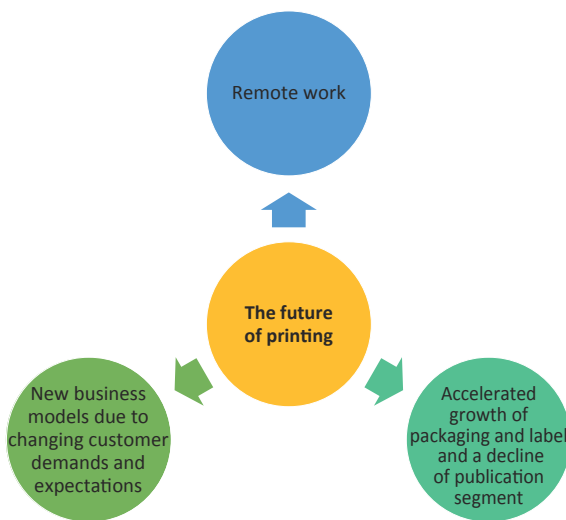


Figure 6: PSPs' perspective on the future of printing

4.2.1 The impacts of Covid-19 on the printing industry

The analysis of the interviews resulted in four broad impact areas resulting from the Covid-19 disruption, namely increased costs, lower demand, operational disruptions and uncertainty in business direction.

Operational expenditures increased during the Covid-19 pandemic. The increased costs, as reported by the respondents, were primarily due to additional expenses needed to comply with compliance requirements. As interviewee C put it: *"The pandemic increased the overall operation costs, especially with the increase of need-for-safety and health compliance requirements."*

The interviewees were also confronted with the serious challenge of a reduced demand for their products and

services. As interviewee B said, *"Covid-19 has impacted demand greatly."* Another interviewee (interviewee E) alluded to the consequences of reduced demand by commenting that: *"Adding on to the Covid-19 pandemic, a lot of businesses had to temporarily close largely due to reduction in demand..."* Interviewee D commented: *"We are facing a sharp drop of business of 50–60 %."*

During the pandemic, the MOC imposed by the government resulted in operational disruptions. Consecutive closures, a reduction in employee capacity and classification of essential services were the main causes. Talking about this issue, interviewee A said: *"Business interruption is severely affected – production is partially or totally shut down. During the stage when the printing industry is allowed to operate, only 50 % of the workforce is involved! – the government ruling has created difficulties for the printing industry to mobilize its workforce."*

Other responses to this question included one given by interviewee C: *"We were lucky to be part of the supply chain, which allowed us to get permits from the authorities to operate. However, there was a headcount limit to comply with, hence output was definitely lower."*

There was a sense of uncertainty about the future of the printing business amongst the interviewees, as illustrated by interviewee A, who plainly stated that: *"The pandemic caused uncertainties to future businesses."* This view was echoed by interviewee B who said: *"We have to grow our market and develop new products to offset the drastic drop in demand. But this can only reduce the impact."* There were also some suggestions regarding the direction of the print industry prior to the pandemic. As interviewee E said: *"Even before the Covid-19 pandemic, a lot of businesses already needed to rethink their business models if their businesses were to survive in this new digital era where everything is moving towards digital or electronic."* Commenting on this issue, interviewee E further elaborated: *"However, there is always a silver lining in our printing industry where businesses servicing selected markets (such as glove manufacturers, healthcare, courier delivery services, food packaging, and so on) are doing extremely well during this challenging time."*

4.2.2 Strategic management approaches during the crisis

Interviewees stated that they used several strategies and mechanisms to mitigate the impact of Covid-19.

A common view from the analysis suggests that businesses need to improve and innovate by diversifying product and services offerings, reducing costs, and improving health and safety.

The most resilient PSPs responded to the pandemic by improving and innovating their products and services. A variety of perspectives were expressed by the interviewees in this regard. It was suggested by interviewee A, for example, that: *“production of conventional products and services will be slowed and eventually diminished...”* and that *“diversification of new products is essential”*. In another instance, interviewee E thought that improving services and product offerings through investment in Research and Development (R&D) would allow *“[us] to continue investing in our R&D to improve our services and product offerings”*. Interviewee D responded to this question by stating: *“...meanwhile, we also rolled out a direct to garment (DTG) shirt printing business and canvas home deco printing services”*.

Commenting on improving their products and services, interviewee C said, *“This is a good alarm and indication for us to restructure our business direction, and to reallocate our level of exposure in the market moving forward.”*

It was further suggested that financial management during the pandemic was crucial to the survival of the business. Interviewee B said: *“Cost cutting measures such as reducing overhead and capacity and investing in new technologies to improve efficiency helped us to mitigate the impact.”* This view was echoed by interviewee A, who experienced delays of orders and payments: *“Customers have delayed placement of orders, which causes deferred payments.”*

The pandemic also exposed a severe health risk. There was a suggestion from interviewee C that enhancing employee health and safety should become a top priority. For example, interviewee C said: *“The biggest step is to ensure the safety and health of our employees by enforcing visitor restrictions, scheduling factory sanitization, investing in necessary personal protective equipment (PPE) for all employees and, most importantly, educating them on the importance of keeping good hygiene and following social distancing social operating procedures (SOPs) at work and avoiding going out unnecessarily on off days, which may risk exposure to the Covid virus. This is of utmost importance as it holds the biggest risk of factory closures should there be any infected cluster found in the factory. To keep business and operations going, the safety and health of the employees is not to be compromised.”*

4.2.3 The PSPs’ perspectives on the future of printing

While the PSPs expressed several concerns about the future of the printing industry, three broad themes emerged from the analysis. First – changes in working styles; second – the accelerated growth of packaging

and labelling materials with the simultaneous decline of the printed publications segment; and third – changing customer demands and expectations.

Lockdowns and movement restrictions have changed corporate dynamics, with many businesses adapting to these changes by increasingly utilizing online platforms. Interviewee C felt that *“during the pandemic lockdown, many businesses came to realize the importance of having an online platform, remote access and cloud servers and to be able to work from home”*. Interviewee B, meanwhile, considers online platforms as a growth opportunity. He said: *“E-conferencing and online businesses will have major growth potential.”*

The pandemic has accelerated the packaging and labelling segment due to the growing demand for essential medical supplies and the shift towards e-commerce. Talking about this issue, interviewee D said: *“Packaging & label printing businesses will also accelerate faster than predicted.”* And interviewee A commented: *“We observed growth in the areas of paper box packaging, flexible packaging, digital publication, and e-media marketing.”* Commenting on the other printing segments, interviewee A said: *“The bigger impact will be on reading materials, like newspapers, books, text-books, magazines, etc.”*

There were several negative outlooks about the future of the printing business. For example, interview D said: *“I foresee traditional printing business will decline tremendously, while on-demand printing will be more popular due to technology accelerations in the communications sector.”* In one case, interviewee B thought that *“in the near future, there will be a major repositioning of players and a consolidation of the industry”*. The majority of interviewees agreed that e-commerce platforms will have greater significance going forward. Interviewee B, for example, commented: *“Many businesses realize the benefits of having an online/e-commerce platform, which is not actually a new trend but getting more relevant now as it seems to be one of the most cost-effective ways for businesses to survive, or even progress as a result. This has kept us printers with something to think about: how to be part of the e-commerce contactless business game.”*

The interviewees, on the whole, expressed a need to leverage new technology to create innovative products and improve business efficiency. Commenting on this, one of the interviewees (E) said: *“Some digital printers will buck this trend by creating innovative products and services to offer to the consumer market through convenient and impulse online purchases.”* Another commented: *“Last but not least, this is none other than leveraging of technology in the printing industry to keep up with modern societal behaviours and lifestyles.”*

The findings in this chapter therefore clearly indicate that PSPs are experiencing challenges due to the Covid-19 pandemic and on-going digitalization; that they have implemented several strategies and mechanism to mitigate the impacts thereof. Nevertheless, they demonstrate an overall positive outlook for their businesses. In the next chapter, we discuss the findings of the study in depth.

5. Discussion

The goal of the present article is to understand the growth of the Malaysian printing industry in the context of its reaction to the Covid-19 pandemic. In particular, it aims to understand how the Malaysian printing industry performed from 2019 to Q2 2022, as well as how the pandemic impacted Malaysia's PSPs.

To answer the first question, we analyzed the performance of the printing industry and its contribution to Malaysia's GDP by evaluating statistics published by the Department of Statistics Malaysia (DOSM).

Our study found that the printing industry is in a state of recovery and performed moderately well amid domestic and global uncertainty. Furthermore, our findings suggest that the growth of the printing industry is largely influenced by macroeconomic factors and consumer demand. Additionally, according to Kusa, Duda and Suder (2022), opportunity-seeking, proactiveness, innovativeness, diversification and inter-organizational cooperation are among the factors that can lead to growth.

On a more micro level, we found that digital communications have surpassed print media communications as evidenced by declines in advertising expenditure for print media over the last 10 years.

To answer the second research question, we collected and analyzed data via multiple case studies among industry PSPs. Our results showed that the impacts of Covid-19 on the printing industry were increased costs, reduced demand, disrupted operations and future business uncertainty. In addition, we found that our interviewees had utilized strategic management approaches during the crisis by improving and innovating to diversify product and service offerings, reducing costs and improving employee health and safety. This has not only led to increased strategic management planning but to projections of increased remote work, the accelerated growth of the packaging and labelling segments with a simultaneous decline of the publication segment and implementations of new business models due to changing customer demands and expectations.

All of these findings directly affect Malaysia's printing industry. For instance, our findings align with those of Davis (2019), and Mallardi (2017), wherein the industry has performed as expected given the influence of internal and uncontrollable external factors. The outbreak of Covid-19 has greatly and adversely impacted the printing industry by negatively affecting demand. Of particular significance, it is widely believed that lower demand is the direct result of changing consumer behaviour largely due to both demographic shifts and the proliferation of digital media, which has been notably driven by the use of the internet, social media and mobile devices. As the pandemic hit globally, this further accelerated the shift. Thus, as the growth of the industry is largely driven by demand and sensitive to technological changes, PSPs certainly have a vested interest in keeping up-to-date with these. However, as of yet, no research is available that focuses on this aspect of the industry, meaning that PSPs, lacking the necessary guidance, need to develop strategies to oversee their businesses that include exploring new products as a reflection of changing consumer behaviour.

It is likely for the above reason that many people believe the print industry is in a state of decline. Over the past decade, ADEX for print media have seen negative growth as an impact of rising digital communications and media, which consequently impacted on-demand printing tremendously, as shown in Figure 3. This finding is consistent with that of Fuxman, et al. (2014), who suggested that digital advertising is an effective way to target potential customers. Furthermore, there is ample reason to believe that print media ADEX will continue to decline over the next 10 years.

However, the news is not all bad as new opportunities for print and printers have also been created. In fact, today's printers are very much engaged in digital communications for their customers, with print being integrated into a total communications model (Thomas and Douglas, 2021). Therefore, our findings offer a counter argument: print products can be enhanced with special effects to improve acceptance and PSP competitiveness.

To illustrate, consider printed books, which play an important role in education. According to the Mangen, Olivier and Velay (2019), students who read from printed books perform better in reading tests. Previous research by Masod, et al. (2015), has proved that special effects on a printed sample influence user perceptions regarding its content. Of even greater significance, this application enables printers to stand out among competitors. Therefore, with a new line of research to increase efficiency and the quality of printed books, PSPs will certainly be able to provide a new range of offerings.

Thus, we believe that the widely held misconception among the public and within the industry that printing is a “sunset” industry, is premature. On the contrary, the prospects of the Malaysian printing industry are optimistic, despite the slow economic recovery and the influence of external factors. A possible explanation for this might be that printing products play significant roles to Malaysians as a whole. It is thus expected that demand will improve and that the printing industry will gradually grow over time following the Covid-19 health impacts and the global recession. Moreover, we believe that the lessons learned during the pandemic have prepared PSPs for future crises both in terms of adaptation to changing trends, incorporation of strategic management, and an altered mindset in terms of health and safety preparedness.

Several studies (Portuguez Castro and Gómez Zermeño, 2020; Varelas and Apostolopoulos, 2020) have highlighted the importance of strategic management during a crisis, with innovations being observed as having a high level of significance in the printing industry (Tan and Teo, 1997; Thomas and Douglas, 2021). A key to the survival of businesses in the printing industry is their demonstrated entrepreneurial resilience to successfully navigate through a crisis, as similarly observed by Stephan, et al. (2021). The concept of resilience can be viewed in a variety of ways, including as the traits or characteristics of entrepreneurial firms or individuals; as a catalyst for entrepreneurial intentions; as entrepreneurial behaviour that enhances organisational resilience; as the fostering of resilience at macro-levels (regions, communities, economies); as resilience in the context of entrepreneurial failure; and as a process of recovering from crisis and transforming oneself (Korber and McNaughton, 2018).

Applying these findings in the wake of Covid-19, it is evident that the already existing digitization trend accelerated and caused organizations to re-evaluate many aspects of their work (Anderson, Bieck and Marshall, 2021). The availability of technology made PSPs realise new ways of accomplishing a variety of tasks. This led many PSPs to allow employees to implement remote work, particularly for those in administrative positions, most likely due to advances in communications technology and internet access.

Looking ahead, from the perspective of product segments, PSPs foresee the packaging and labelling segment continuing to rise in the future. Their views are in line with Smithers’ report, *The Future of Global Packaging to 2026* (Platt, 2021; Packaging Europe, 2021). The report shows that packaging demand will grow steadily at 4.8 % over 2020–21 to reach USD\$ 1.22 trillion by 2026, which is in line with our findings. One possible explanation for this is the omnipresent nature

of packaging in daily life. Another is the demand for e-commerce-ready packaging due to the rise of e-commerce. In fact, it is predicted that specialty packaging, which is made from rigid plastics and metal, will have a place in all product segments. Moreover, as consumer demands and expectations are also trending towards personalization, it is imperative for the printing industry to be more efficient by engaging customers with multichannel strategies. This will allow new opportunities on the global scale rather than being limited to the relatively small Malaysian population.

On the operational side, printers should direct future investments towards new technology to improve operational efficiency, thus creating a competitive advantage (Porter, 1985). Several studies by Tay, Alipal and Lee (2021), and Ghobakhloo (2018) have stressed the importance of technological innovation during crises. In fact, the use of smart manufacturing allows adaptation to changing demand and conditions in the factory and supply chain in real time, as well as changes in customer needs (Abadli and Otmani, 2014). In this study, we found that some PSPs are more resilient and innovative, and adapted to the imposed restrictions and requirements by offering products and services tailored to their customers’ needs. Furthermore, some PSPs invested in new technology for research and development, which is in line with the findings of Gamprellis, et al. (2021). These advanced digital technologies, for instance artificial intelligence (AI) (Kinkel, Baumgartner and Cherubini, 2022), enabled companies to achieve highly efficient production. However, according to Tay, Alipal and Lee (2021), Malaysia’s manufacturing industry has not yet taken a clear path towards adopting advanced digital technologies. However, as of yet, no research has been conducted to verify the effects of these shifts.

Lastly, in terms of the literature on this subject, very little was found on the question of what impact the Covid-19 pandemic has had on the Malaysian printing industry and how its PSPs fared during this time. With respect to the second research question from this study, however, it was found that Covid-19 provided a new type of challenge for PSPs, and we hope the findings of this study contribute and support business coping strategies during crises as suggested by Kraus, et al. (2020) by providing extended evidence of the economic impact of Covid-19 on the printing industry. Secondly, we feel the findings of this study contribute to and support the impact study of Covid-19 on businesses by Shafi, Liu and Ren (2020) by providing insight into strategic management within the printing industry.

Moreover, this study supports evidence from previous observations (e.g. Kraus, et al., 2020; Shafi, Liu and Ren, 2020) that suggest the impact of Covid-19

was universal, that is, it affected global economies and printing businesses. The findings of this study are also in line with Liu, Lee and Lee (2020) who reported on the challenges and opportunities of Covid-19 on management and businesses from an Asian perspective, thereby providing further insight into the challenges and opportunities arising from Covid-19.

While our findings suggested that the pandemic has certainly had a significant impact on the industry in the short term, the long-term effects of digitalization and automation are likely to be more radical and pronounced, particularly for the printing industry (Politis, 2019; Naletina, 2021).

As highlighted by Magadán-Díaz and Rivas-García (2021), the on-going shift from analogue to digital production technologies and the internet have altered how the media is produced, distributed and consumed. Thus, it is important to consider the balance between the positive and negative effects of both digitalization and the pandemic.

Our analysis suggests that the printing industry in Malaysia is experiencing both positive and negative effects from digitalization and the pandemic. On the positive side, digitalization has opened up new opportunities for printing companies to expand their services and reach new customers. For example, the companies that we interviewed implemented improvements and innovations to diversify product and service offerings. Additionally, the pandemic has led to increased demand for certain types of print products, such as packaging and labels for food and healthcare products.

However, as highlighted by Thomas and Douglas (2021), the move towards digitalization has also created challenges for the printing industry, such as increased competition from online printing services and declining demand for traditional print products. The pandemic has further exacerbated these challenges, leading to supply chain disruptions, reduced demand for certain types of print products, and increased pressure to adopt digital technologies.

6. Research implications

This study hopes to contribute to the literature on strategic management, especially to disrupted industries like printing, and to provide new managerial insights by sharing new findings on the current state of the printing industry, particularly in the Malaysian context. Furthermore, we find that strategic management, changing customer demands and expectations, and new business models are essential factors for success in the printing industry.

7. Limitations

Our study has two main limitations. First, it should be noted that we consider only Malaysia's GDP and Malaysia's advertising expenditures as macroeconomic indicators to the performance of the printing industry. However, since our study is the first to address this specific industry, the findings are deemed significant to the academic, practitioner and policy maker. Future research should look at macroeconomic indicators holistically to adequately represent the growth of the printing industry.

Another limitation is the low sample size. Our sample size was limited because of the lack of resources to fund the expansion of our research. A larger sample would allow us to cover different types of printing segments, such as security printing and large format printing. However, despite the low sample size our results are significant. This speaks to the fact that all of our interviewees have more than 15 years' experience in the printing business. Further, we observed that their insights support the economic data presented in the first stage of this study. Future research should be conducted across the full spectrum of the Malaysian printing industry to consider diverse printing segments and their supply chains.

Since our study focused on the impact of Covid-19, it is also important to consider the impact of digitalization alongside pandemic. While the pandemic has had a significant impact on the industry in the short term, it is important to recognize that digitalization is a long-term trend that will continue to drive change in the industry. Future research could focus on the balance between the positive and negative impacts of digitalization and the pandemic and how these forces of change are shaping the industry over time.

8. Conclusion

This research helps to better understand the growth of Malaysia's printing industry, specifically as it focuses on PSPs in the Selangor and Klang Valley of Malaysia.

Despite its significant role in the national economy, the printing industry has been disrupted by rapid increases in new media, the internet and, recently, the Covid-19 pandemic. We find that Malaysia's printing industry will have positive future growth driven by demand and macroeconomic conditions. In order for printers to not only succeed but actually survive, they must continue to add value by offering diversification of products and services, adapting to changing consumer needs, implementing research and development and adopting advanced digital technologies.

We found the impacts of Covid-19 can be viewed as negative or positive for the printing industry. Negative impacts are primarily financial, such as increased costs and declining demand. Meanwhile, on the operational side, Covid-19 disrupted certain operations and existing business directions. On the positive side, we found that the pandemic allowed PSPs to diversify and improve their product and service offerings and explore new market segments. This has led most PSPs to become resilient and innovative and to strategically manage their businesses and adapt quickly to change.

The issue of adapting the printing industry to the age of automation and digitization could be usefully explored in further research. Furthermore, if the printing sector

embraces digitization to a substantial degree, it would be worthwhile to conduct a similar study of the resulting outcomes. All productivity indicators should therefore be quantified to statistically reflect the benefits that the printing industry accrues across all or parts of its sectors.

Future research may extend this work by focusing on the printing industry's employees as well. Workers in this industry have always been a vital component in its growth. It is therefore essential to investigate not only if these individuals have the appropriate background to enter the digitization process, but also whether and how the printing industry's digitization will integrate them into this new working environment.

Acknowledgements

The authors would like to thank reviewers for their helpful and constructive comments and suggestions that greatly contributed to improving the final version of this paper. Special acknowledgement to the College of Creative Arts, Universiti Teknologi MARA (UiTM) Shah Alam Selangor Malaysia, the Department of Statistics Malaysia, TM Info-Media Sdn. Bhd, Companies Commission of Malaysia, The Selangor & Federal Territory Chinese Printing Presses Association, the Research Ethics Committee, UiTM, the Malaysia Advertiser Association, the Malaysia Printers Association, the Malay Printing Entrepreneurs Association of Malaysia, the Selangor & Federal Territory Chinese Printing Presses Association and individuals within organizations for their time and valuable consultations.

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