



## JOURNAL OF ECONOMICS AND SUSTAINABILITY

<http://e-journal.uum.edu.my/index.php/jes>

How to cite this article:

Wong, S.Y. (2022). A review of the economic impact of the COVID-19 pandemic on the automobile industry in Malaysia. *Journal of Economics and Sustainability*, 4(2), 1-12. <http://doi.org/10.32890/jes2022.4.2.1>

### A REVIEW OF THE ECONOMIC IMPACT OF THE COVID-19 PANDEMIC ON THE AUTOMOBILE INDUSTRY IN MALAYSIA

<sup>1</sup> Wong Sing Yun

<sup>1</sup> Faculty Business, Economics and Accountancy, Universiti Malaysia Sabah

Corresponding author: [yutina707@yahoo.com](mailto:yutina707@yahoo.com)

Received:22.3.22

Revised:6.6.22

Accepted:21.6.22

Published:31.7.22

#### ABSTRACT

The COVID-19 pandemic has resulted in a disastrous impact on the production and sales of many industrial sectors. Voluminous past literature has shed light on the negative implications of the pandemic crisis on these sectors. However, this paper aims to draw light on the impact of the pandemic crisis on the automotive industry, one of the nation's largest industries. A comprehensive review will be performed to demonstrate the significant implications of the COVID-19 pandemic on the automobile industry. In addition, an evaluation of the government's measures to mitigate the negative impacts of COVID-19 on individuals and economic sectors is presented in this paper. An examination of the effectiveness of the government's move in assisting the recovery of the industrial sector, specifically the automotive sector, is done through the evaluation of the sales volume data. Therefore, the implications of this study are to demonstrate the association between the effect of the pandemic crisis and the automotive sector's production. Secondly, to provide a review of the government's measures and to present its association with the sales volume in gauging the effectiveness of the measures adopted. The findings of this study presented robust evidence of the negative implications of the COVID-19 pandemic on automobile production and sales volume. Notably, the decline of sales and production units is more apparent during the period of the nation's lockdown due to COVID-19. Besides, this study has made a noteworthy contribution by discussing the government's policy measures implemented during this pandemic crisis.

**Keywords:** COVID-19 implications; Automobile industry; Government's strategies; Production; Sales.

#### INTRODUCTION

The pandemic of COVID-19 has invited increasing interest among scholars to examine its global economic implications. The lockdown of cities and the closing of the national borders have resulted in devastating macroeconomic shocks. The growing literature on the global economic

implications confirms that governments' stringent restrictions in response to the pandemic have created negative economic implications with evidence of economic shocks across countries. In addition, many reports have highlighted the severe disruptions to various industrial sectors caused by the pandemic. Both demand and supply shocks have further pressurized these industries, interrupting their operations and pushing some towards the brink of closure. Nicola et al. (2020) pointed out that the dire consequences of COVID-19 have caused further damage to the primary, secondary, and tertiary sectors. The adoption of restrictive measures by many countries has either slowed, paralyzed, or even stopped the economy (Kufelová & Raková, 2020). Due to the detrimental effects of the pandemic, a recession is expected in many countries and a likely decline in the gross domestic product (GDP).

According to Kaitwade (2020), the automotive industry is an important revenue contributor in both emerging and developed economies. It is often considered the backbone of the countries' gross domestic product (GDP). This simply means that the economic growth of a country may well rely on the performance of the automotive industry. Before the COVID-19 pandemic, the automotive sector was projected to witness steady growth throughout the decades. The unleashing of the first wave of the COVID-19 pandemic in early 2020 in the Chinese province of Hubei has led to massive disruption in the automotive industry. According to Trovão (2020), China, as a prominent assembling hub and a component centre serving parts manufacturers around the world, is aggravated by shocks to global demand that threaten the reduction of 20% (at worst of 40%) of the projected global sales of cars in the year 2020. Pató and Herczeg (2020) highlighted how the limitations faced by the global logistics services and the temporal shutdown of production in various factories have caused massive disruption to operation of numerous supply chains. This situation has posed a difficult challenge to most economic sectors, including the automotive industry. The automobile industry is highly desired in many countries as a driver of economic growth, job creation, and technology development (Mohd Zubir et al., 2012). Given the significance of the automotive sector to the economy, this paper will focus on reviewing the challenges faced by Malaysia's automobile industry amid the COVID-19 pandemic.

To mitigate the substantial impacts of the crisis, governments worldwide have increasingly adopted many policy strategies. The Malaysian government has also undertaken several measures to assist the severely affected sectors. Economic stimulus packages are launched to provide relief to the various affected sectors and reinvigorate economic growth. The relief comes in various forms, such as new tax incentives, financial assistance for small and medium-sized businesses (SMEs), and job protection initiatives. The government has injected a large amount of budget into the stimulus package to support the different sectors affected by the pandemic crisis. This paper will review and discuss the government measures to help recover the automobile industry. Unlike the other literature that generally assesses the impact of COVID-19 on the industrial sector as a whole, this paper will specifically explore the automobile industry. This paper will also contribute by filling the knowledge gap on the recent government measures adopted during the pandemic crisis. The preliminary review conducted will be instructive for future empirical studies on the effectiveness of these government policy strategies.

The remainder of this paper will be structured in this way: Section 2 presents the literature review of the impact of COVID-19 on the automobile industry. In the subsequent Section 3, the methodology employed for this study is explained. The data presentation of the challenge encountered by the automobile industry during the pandemic crisis will be provided in Section 4, followed by Section 5, which will present the result assessment of the government measures to assist the post-pandemic recovery of the automobile industry. Meanwhile, Section 6 discusses the findings and offers recommendations for future research. Lastly, Section 7 will present the conclusion and implications of this study.

## LITERATURE REVIEW

The automobile industry makes up a large share of the manufacturing sector in a country's economy. According to Childerhouse et al. (2013), the automobile industry is a flagship sector frequently regarded as a barometer that measures the current wealth of the national economy. Helper (1991) supports the argument of the importance of the automobile industry due to its large size of production, a great contributor to employment, and an important provider of lessons for firms in other industries. A literature review by Gopal and Thakkar (2015) further depicted the importance of the automobile industry in developing sustainable communities through products, particularly in developing countries.

The literature has discussed the negative implications of COVID-19 on the automobile industry. For example, Rajamohan et al. (2020) demonstrated the negative consequences of COVID-19 on the stock price of the National Stock Exchange (NSE) in the automobile industry. They demonstrated a sudden fall in stock values due to the adverse impact of COVID-19. Hence, it can be concluded that COVID-19 significantly negatively affects the automobile industry stock exchange. Another study by Yan et al. (2020) explored consumers' decisions in automobile purchases during the pandemic crisis by employing a Structural Equation Model (SEM-Logit) model. They found that the COVID-19 pandemic negatively affected consumers' decisions to purchase automobiles.

Other studies, such as Behaldi et al. (2021), Cai and Luo (2020), Nayak et al. (2020), and Wong (2020), discussed the economic implications of COVID-19 on various industrial sectors. Cai and Luo (2020) highlighted the impact of COVID-19 on the production disruption of raw materials and spare parts, which caused setbacks to the manufacturing industries. Supply chain interruption has greatly hit industries, particularly automobiles, electronics, and machinery industries. Besides, the change in the volume and structure of demand further disrupted the industry. Meanwhile, Wong (2020) shed light on the unprecedented effects of COVID-19. Severe disruptions to supply mechanisms and distribution chains, the collapse of domestic demand, the loss of public confidence worldwide, the negative impact on stock market exchange, and changes in the households' consumption behaviour were among the precarious effects of the pandemic crisis.

According to Behaldi et al. (2021), the raging pandemic has brought the aspirations of major automobile companies to a grinding halt. The operation of manufacturing plants in the automobile industry slowed down due to the lockdown protocols and standard of procedure taken as safety measures against COVID-19. The government-imposed lockdown restrictions have forced the closure of factories and showrooms, with potential car buyers staying at home. Major automobile firms were reported to have cut jobs as sales decreased due to the ongoing pandemic. Nayak et al. (2020) demonstrated the impact of COVID-19 on the automobile industry by discussing the effects of COVID-19 on auto dealers, auto suppliers, finance companies, and sales. A critical review was also provided on the impact of the automobile industry, considering that the automobile industry is responsible for the economic growth of the country. The national lockdown led to the disruption of transportation of vehicles by auto dealers. Meanwhile, auto suppliers will face liquidity challenges due to the delayed recovery post lockdown. Finance companies will also face a financial burden with the increase in loan evasions due to the ongoing pandemic. The automobile vehicle sales will fall as demand declines, and supply production is disrupted during the lockdown period.

A study by Accenture (2020) pointed out four major challenges to the automobile industry amid the COVID-19 crisis: the supply shortage of vehicle parts, a manufacturing shutdown, a decline in vehicle sales, and a drop in working capital and liquidity. Worldwide automobile production is highly dependent on the exports of automobile parts from China. Hence, the pandemic of COVID-19 that initially began in China has led to the shutdown of production lines, causing supply deficiency for all automobile industries. Secondly, the quarantine measures resulted in a reduced workforce and the shutdown of the manufacturing plants. Thirdly, the implementation of lockdown

further caused a decline in the sales of vehicles. Lastly, the drop in cash inflow with short-term liabilities needing to be paid has led to the depletion of cash reserves.

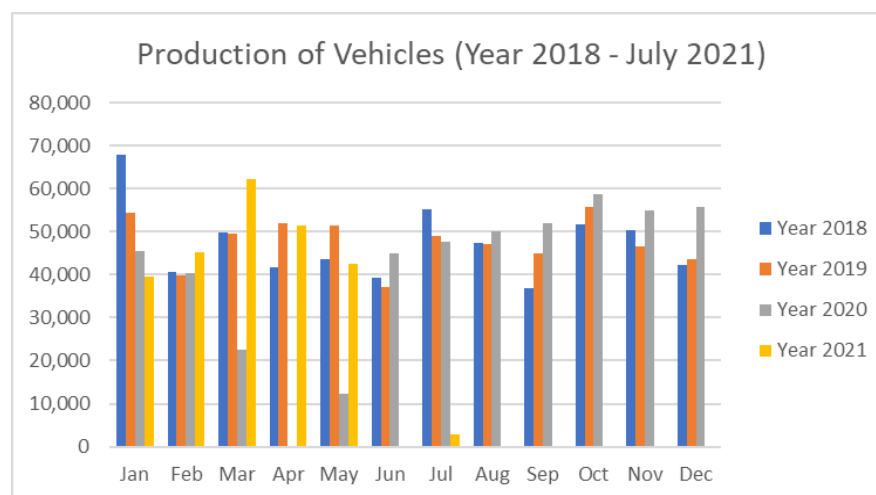
Much literature exists on the impact of COVID-19 on the industrial sectors. However, a review of the direct implications of COVID-19 on the volume of sales and production of automobiles is yet to be made. Besides, the examination of the government's policy to cope with the pandemic crisis has been largely neglected. Motivated by the literature gaps, this paper presents and describes the impact of COVID-19 on Malaysia's automobile industry. In addition, this study discusses the measures undertaken by the Malaysian government to help the automobile industry cope with the pandemic-caused economic disruption. The knowledge from this investigation will be useful for policymakers to develop strategies that mitigate the pandemic-induced economic implications and assist the post-pandemic recovery of the automobile industry.

## METHODOLOGY

For this study, data were obtained from the Malaysian Automotive Association, Motorcycle, and Scooter Assemblers and Distributors Association of Malaysia. The automobile sales and production data from 2018 until July 2021 were analyzed and plotted. The data from the period before the pandemic crisis, during the lockdown period, and after the government's initiation of policy to assist with the recovery of the automobile industry were selected. The trend of the data was assessed to determine the COVID-19 implications on the automotive sector. This study also assessed and reviewed the government's policy measures adopted to help the automobile sector's recovery.

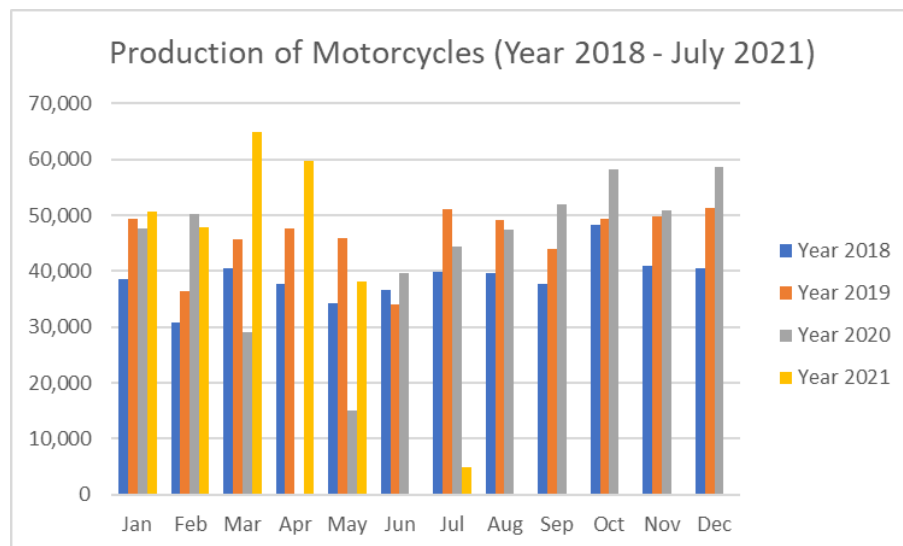
### COVID-19 IMPLICATIONS ON THE AUTOMOBILE INDUSTRY'S PRODUCTION

The COVID-19 pandemic has posed various challenges to the automobile industry, from disrupting production lines to dampening new vehicle sales. Wad and Govindaraju (2011) demonstrated that the global economic crisis has ultimately led to the contraction of the automobile industry. A collapse in the production of vehicles and a drop in the recorded total vehicle sales were evident from their analysis. This paper seeks empirical support to analyze the impact of the COVID-19 pandemic crisis on the growth of the automobile industry. Figure 1 shows the monthly data of the total vehicle production from 2018 until July 2021.



**Figure 1.** Production of vehicles before, during, and after the COVID-19 pandemic.  
Source: Malaysian Automotive Association, Motorcycle, and Scooter Assemblers and Distributors Association of Malaysia (2021)

Overall, a contraction of vehicle production due to COVID-19 was evident from the data observed. The spreading of the COVID-19 pandemic to Malaysia has led to implementation of a movement control order (MCO 1.0) beginning in March 2020. The imposition of the MCO 1.0 resulted in the closure of the operations for non-essential sectors nationwide in a bid to curb the spreading of COVID-19. The data shows the disruption to the production of vehicles and motorcycles during the lockdown period. In March 2020, the production of the vehicle dropped nearly half from 40,340 to 22,657. By April 2020, the number of vehicles declined to the lowest point, with only 275 units being produced. The production of vehicles grew slowly, with 12,286 being produced in the subsequent month in view that the lockdown restriction would be gradually eased in May 2020 to allow certain sectors to resume operation. A similar trend can be observed for the production of motorcycles during the lockdown period of MCO 1.0, as shown in Figure 2. Motorcycle production declined by half from 51,843 units to 26,697 units in March 2020. The implementation of strict lockdown order resulted in a complete shutdown of the operation, leading to zero units of production of motorcycles for April 2020 alone. The gradual relaxation of the MCO 1.0 order allowed the resumption of the operation; hence, about 19,507 units of motorcycles were produced in the subsequent month. The production unit was so much fewer compared to the production in the past before the COVID-19 pandemic.



**Figure 2.** Production of motorcycles before, during, and after the COVID-19 pandemic.  
Source: Malaysian Automotive Association, Motorcycle, and Scooter Assemblers and Distributors Association of Malaysia (2021)

In Jun 2021, the steep climb of the COVID-19 cases forced the government to implement a Full Movement Control Order (FMCO). The lockdown led to a drastic decline in the production of vehicles from 42,522 units to only 276 units produced in Jun 2021. Similarly, the production of motorcycles dropped to 45 units in Jun 2021. With the ending of the FMCO on 28 June 2021, some economic sectors were allowed to reopen. As a result, the production of the vehicle increased to 2,775 units in the subsequent month of July 2021, and the production of motorcycles went up by 4,895 units in July 2021.

## GOVERNMENT'S MITIGATION STRATEGIES ON COVID-19 IMPLICATIONS

Since February 2020, the Malaysian government has launched about eight stimulus packages of USD127 billion to mitigate the economic impact caused by the pandemic crisis. The latest economic stimulus package, PEMULIH, was launched in June 2021 to support the affected households and business sectors. Table 1 summarises the measures or strategies undertaken by the Malaysian government to alleviate the burden on the people, businesses, and industrial sectors affected by the COVID-19 pandemic.

Table 1  
*Summary of Economic Stimulus Package Launched*

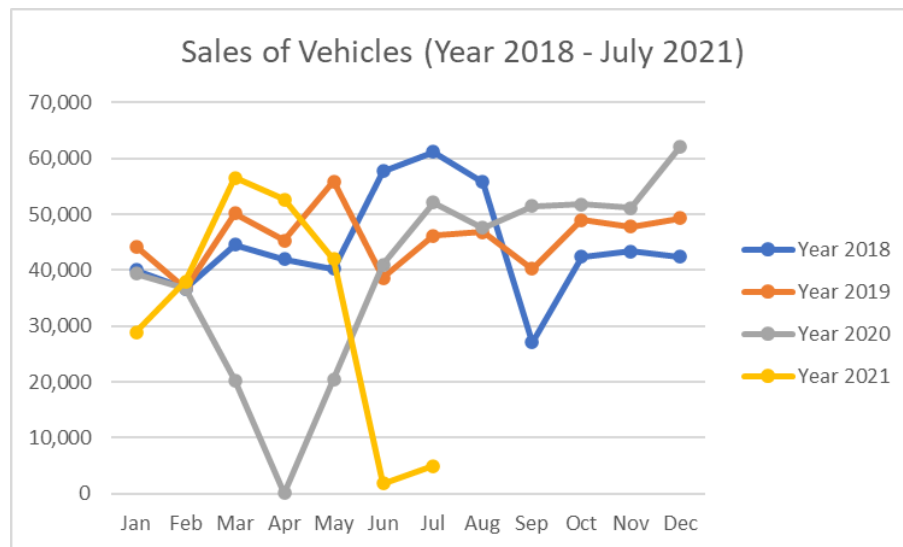
<b>Economic Stimulus Packages</b>	<b>Strategies</b>	<b>Expected Outcome</b>
First Economic Stimulus Package 27 February 2020	Deferment of monthly tax instalments	To help ease the cash flow of companies
	Tax deductions on expenses on disposable Personal Protective Equipment (PPE) for employees incurred on business premises	To encourage companies to take up relevant precautions to mitigate the spread of COVID-19 at the workplace
	Reduction of employees contribution from 11% to 7%	To encourage more spending by employees to stimulate economic activities
	15% electricity discount	As part of the initiative to provide financial relief
	Exemption from the human resources development fund (HRDF) levy	
	Matching grants for HRDF by prioritizing affected sectors (including automotive manufacturing)	To invest in raising the productivity of human capital during the economic slowdown period
PRIHATIN 27 March 2020	Wage Subsidy	To assist employers in retaining their workers, avoiding retrenchment
	Automatic six months loan moratorium	To ease the burden on business sectors and assist in businesses' cash flow
	EPF i-Lestari Scheme	As financial relief to individuals
	Cash aid from the government	
	SME loan funds	To assist viable SMEs
	Corporate loan guarantees	Restructuring repayments for the affected corporate sector
PRIHATIN SME+ 6 April 2020	Special grant for micro SMEs	To provide additional cash flow to micro SMEs to cover their overhead costs
	Additional wage subsidy	Enhancement of wage subsidy program to alleviate affected employers' cash flow
PENJANA 5 June 2020	Wage subsidy extension	To promote employee retention
	Reskilling fund	To enhance the employability of unemployed

	Financing and liquidity support	To sustain business operations
	E-commerce incentives	Encouraging the adoption of e-commerce by micro SMEs
	Tax incentives for the purchase of passenger cars until 31 December 2020	To stimulate the automotive sector and provide financial relief to car buyers
KITA PRIHATIN 23 September 2020	Special grant for micro SMEs	To provide financial assistance for affected SMEs
	Wage subsidy 2.0 extension	To promote employee retention
	Bantuan PRIHATIN 2.0	Part of the financial relief initiative
PERMAI 18 January 2021	Wage subsidy 3.0	To promote employee retention
	EPF i-Sinar Program	To alleviate the burden of contributors
	Loan moratorium	As financial relief and to help ease cash flow for business sectors
	Extensions of sales tax exemption on passenger vehicles until 30 June 2021	To stimulate the automotive sector and provide financial relief to car buyers
PEMERKASA 17 March 2021	Special grant for SMEs	Financial support to steer economic growth
	Wage subsidy	Retaining workers initiative
	Loan Moratorium	Relief for loan repayment
	Tax relief for rental discount	Support for business continuity
	Postpone tax penalties	Reducing the financial burden on businesses
PEMERKASA+ 31 May 2021	Extension of the wage subsidy program	Retaining employment
	Exemption HRDF levy	Financial assistance
	Special Prihatin grant	
	Micro Credit Financing	Financial support for businesses
	Extension of sales and services tax (SST) exemption for passenger vehicles extended until 31 December 2021	To stimulate the automotive sector and provide financial relief to car buyers
	Late payment exemption on business license renewal	Easing the burden on businesses sectors
PEMULIH 28 June 2021	Cash aid	Financial relief to individuals
	Electricity bill discount	Financial assistance
	Loan moratorium	Easing cash-flow
	EPF i-Citra	To alleviate the burden of the contributor
	Wage subsidy scheme	Initiative to retain workers

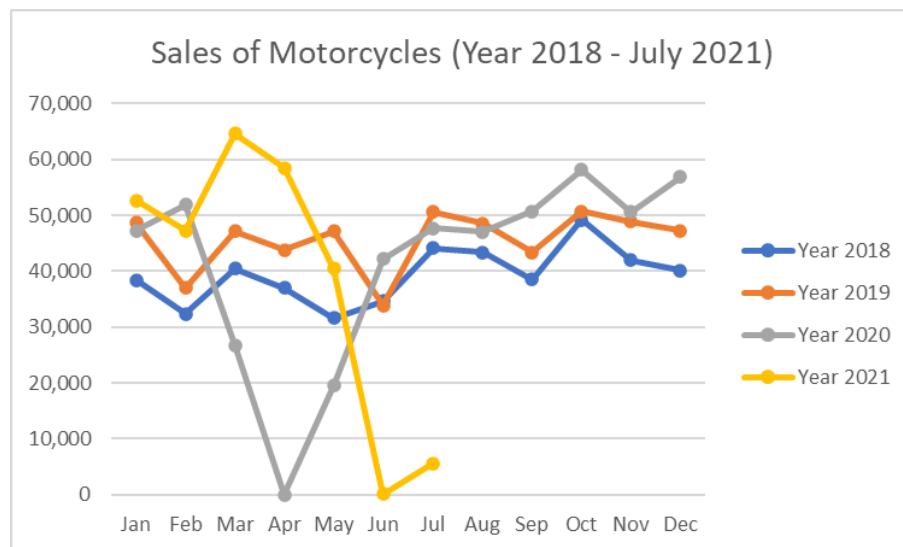
Source: Ministry of Finance Malaysia (2021)

This paper highlights the government measures in supporting the automobile industry through the exemption of sales and services tax (SST) on passenger vehicles aiming to stimulate the

automobile industry. Under this measure, 100% exemption was given for CKD (locally assembled) cars and 50% for CBU (fully imported) cars. This exemption applies to all passenger vehicles (including MPVs and SUVs) but does not include trucks considered commercial vehicles. The sales tax exemption lowers the prices of passenger vehicles to boost sales. However, the global semiconductor shortage will result in poor production of automobiles, and the tax exemption move may not be enough to boost the local automobile industry. To review the effectiveness of the tax exemption in boosting consumption of the automotive industry, the total sales of passenger vehicles from 2018 until July 2021 will be presented and discussed. Figure 3 and Figure 4 show the total sales (units) obtained by the automotive industry for passenger vehicles during the period of study.



**Figure 3.** Sales of vehicles (units) before, during, and after the COVID-19 pandemic.  
Source: Malaysian Automotive Association, Motorcycle, and Scooter Assemblers and Distributors Association of Malaysia (2021)



**Figure 4.** Sales of motorcycles (units) before, during, and after the COVID-19 pandemic.  
Source: Malaysian Automotive Association, Motorcycle, and Scooter Assemblers and Distributors Association of Malaysia (2021)



The sales of vehicles (units) plummeted to a mere 131 vehicle sales in April 2020 from 20,260 units due to the lockdown implemented at the start of the pandemic. This recorded a decrease of about 99.35% compared to the previous month's sales. Another lockdown in 2021 resulted in another demand shock, with 1,841 sales (units) recorded in Jun 2021. This was another massive decline of about 95.62% demand short. With the tax incentives introduced under PENJANA stimulus program, the sales and services tax of passenger vehicles were exempted until 31 December 2020. Following this announcement, the sales of passenger vehicles showed an increasing trend beginning from Jun 2020, with 40,944 sales (units) recorded. The sales continued to increase and peaked at 62,122 sales (units) in December 2020.

In January 2021, the government extended the tax incentive to boost automotive industry sales further. The tax exemption percentage remained unchanged, with a 100% exemption for locally assembled (CKD) cars and 50% for fully imported (CBU) cars. This extension continued to encourage increasing consumer demand following the reduced prices for passenger vehicles, with 56,478 sales recorded by March 2021. However, another wave of the pandemic led to the implementation of the Full Movement Control Order (FMCO) implementation, which again affected vehicle sales. The sales of vehicles experienced another round of decline to 1,841 units sold in Jun 2021. Hence, the government announced the extension of the tax exemption until December 2021 to induce the sales of passenger vehicles. In the recently tabled Budget 2022, the sales incentives for passenger car purchases were further extended until June 2022 to drive sales in the automotive sector.

## DISCUSSION

The current review aimed to evaluate the impact of the pandemic crisis, specifically on the automobile sector. The presentation and review on the sales and production trend gathered from the Malaysian Automotive Association, Motorcycle, and Scooter Assemblers and Distributors Association of Malaysia was conducted to gain an in-depth understanding of the implications of COVID-19 on this sector's production level. The review was also done to explore the government's policy and recovery strategies during the pandemic crisis. The results from this demonstration provided a better understanding and knowledge of the lessons that can be learned from this pandemic crisis. Besides that, the findings of this study have implications for policymakers to develop strategies that can support the recovery of this industry in the post-pandemic. The results of this study further suggest that future research should be conducted to highlight the success of the government's measures, such as the vehicle tax exemption. The review of this paper will assert the need for future research on determining whether the policy measures are effective in boosting automobile sales in the coming months.

## CONCLUSION

In sum, this paper presented a comprehensive review of the impact of the COVID-19 pandemic crisis on industrial sectors, specifically the automotive industry. Besides that, this paper also drew attention to the government strategies in implementing various economic stimulus packages to help the recovery of industrial sectors. A review of the available data for both the production and sales in the automotive sector during the pandemic crisis was also conducted to demonstrate the implications of the pandemic on the automobile industry. The review was further extended to shed light on the effectiveness of the government's strategy to help the recovery of the sector. An inspection was done to observe any changes in the sales of the vehicles in the subsequent months after the sales tax was exempted. A preliminary evaluation of the data suggested that the COVID-19 pandemic significantly caused a drop in production and sales of vehicles. Meanwhile, the government strategy of exempting the sales tax appeared to be effective in bringing up sales. However, experts speculated that the global shortage of semiconductor chips could affect domestic production and sales volumes (Yusof, 2021). The shortage of the components will likely dampen the government measures to boost sales in the automotive sector. Besides that, the continued

shipping delays of components will further slow down production, causing manufacturers to struggle to meet the increasing demand. Hence, this paper recommended that a further evaluation and thorough empirical analysis be conducted to examine the effectiveness of the government's sales exemption measure in helping the recovery of the automotive industry.

#### **ACKNOWLEDGMENT**

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## REFERENCES

- Accenture (2020). *Impact on the Automotive Industry: Navigating the Human and Business Impact of COVID-19*. Retrieved from [https://www.accenture.com/\\_acnmedia/PDF-121/Accenture-COVID-19-Impact-Automotive-Industry.pdf](https://www.accenture.com/_acnmedia/PDF-121/Accenture-COVID-19-Impact-Automotive-Industry.pdf)
- Behaldi, A., Kamble, S., Jabbour, C.J.C., Gunasekaran, A., Ndubisi, N.O., Venkatesh, M. (2021). Manufacturing and Service Supply Chain Resilience to the COVID-19 Outbreak: Lessons Learned from the Automobile and Airline Industries. *Technological Forecasting & Social Change*, 163.
- Cai, M. and Luo, J.W. (2020). Influence of COVID-19 on Manufacturing Industry and Corresponding Countermeasures from Supply Chain Perspective. *Journal Shanghai Jiao Tong University*, 25(4), 409 – 416.
- Childerhouse, P., Hermiz, R., Mason-Jones, R. Popp, A. and Towill, D.R. (2013). Information Flow in Automotive Supply Chains – Present Industrial Practice. *Industrial Management & Data Systems*, 103(3), 137 – 149.
- Gopal, P. R. C., and Thakkar, J. (2016). Sustainable supply chain practices: an empirical investigation on Indian automobile industry. *Production Planning & Control*, 27(1), 49 – 64.
- Helper, S. (1991). How much has really changed between US automakers and their suppliers. *Sloan Management Review, Summer*, 34(2), 15 – 28.
- Kaitwade, N. (2020). *COVID-19 Shatters Global Automotive Industry: Sales of Metal Powder Take a Nosedive Amid Wavering Demand*. Metal Powder Report. *Metal Powder Report*, 76(3), 137 – 139.
- Kufelová, I. and Raková, M. (2020). *Impact of the Covid-19 Pandemic on the Automotive Industry in Slovakia and Selected Countries*. In SHS Web of Conferences, 83, 01040.
- Malaysian Automotive Association, Motorcycle and Scooter Assemblers and Distributors Association of Malaysia (2021). *Economic Indicators*. Retrieved from <https://www.epu.gov.my/en/resources/archives/archive-latest-economic-indicators>
- Ministry of Finance Malaysia (2021). *Economic Outlook 2021*. Retrieved from <https://belanjawan2021.treasury.gov.my/pdf/economy/2021/economic-outlook-2021.pdf>
- Mohd Zubir, A.F., Habidin, N.F., Conding, J., Lanang Jaya, N.A., Hashim. S. (2012). The Development of Sustainable Manufacturing Practices and Sustainable Performance in Malaysian Automotive Industry. *Journal of Economics and Sustainable Development*, 3(7), 130 – 138.
- Nayak, J., Mishra, M., Naik, B., Swapnarekha, H., Cengiz, K. and Shanmuganathan, V. (2020). An Impact Study of COVID-19 on Six Different Industries: Automobile, Energy and Power, Agriculture, Education, Travel and Tourism and Consumer Electronics. *Expert Systems*, 39(3), e12677.
- Nicola M., Alsafi Z., Sohrabi C., Kerwan A., Al-Jabir A., Iosifidis C., Agha M., Agha R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International Journal of Surgery*, 78, 185-190
- Pató, B.S.G, Herczeg, M. (2020). The Effect of the COVID-19 on the Automotive Supply Chains. *Studia Universitatis Babes-Bolyai Oeconomica*, 66(2), 1 – 11.
- Rajamohan, S., Sathish, A., and Rahman, A. (2020). Impact of COVID-19 on Stock Prices of NSE in Automobile Sector. *International Journal of advanced Multidisciplinary Research*, 7(7), 24 - 29.
- Trovão, J.P. (2020). Automotive Electronics under the COVID-19 Shadow. *IEEE Vehicular Technology Magazine*, 101 – 108.
- Wad, P. and Govindaraju, V.G.R. (2011). Automotive Industry in Malaysia: An Assessment of its Development. *International Journal Automotive Technology and Management*, 11(2), 152 – 171.
- Wong, S.Y. (2020). Special Review: Review of Economic Implications of COVID-19. *Thailand and The World Economy*, 38(3), 75 – 83.
- Yan, Y.Y., Zhong, S.Q., Yian, J.F., and Ning J. (2020). *An Empirical Study on Consumer Automobile Purchase Intentions Influenced by COVID-19*. SSRN Paper. Retrieved from <https://ssrn.com/abstract=3593963>

Yusof, A. (2021). *Chip, Parts Shortage Hits Car Sales*. New Straits Times. Retrieved from <https://www.nst.com.my/business/2021/10/738414/chip-parts-shortage-hits-car-sales>