

EXPLORING THE DRIVERS OF FOREST MANAGEMENT CERTIFICATION IN MALAYSIA

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Malaysia has adopted the Malaysian Timber Certification Scheme and the Programme for the Endorsement of Forest Certification (MTCS/PEFC) Forest Management Certification (FMC) to ensure the forest and forest products are managed sustainably and legally since the 2000s. Although the MTCS/PEFC FMC has been practised in Malaysia for more than two decades, the uptake of the MTCS/PEFC FMC remains relatively low. As of 2022, 53% of natural forests and 16% of plantation forests were certified under the MTCS/PEFC FMC. Thus, this study explores the drivers of adopting the MTCS/PEFC FMC. The face-to-face semi-structured interviews were conducted with 15 MTCS/PEFC FMC valid certificate holders from Peninsular, Sabah and Sarawak. The findings revealed that the six drivers, namely market, signalling, legal, incentive, moral and learning, have been significant drivers in adopting and maintaining the MTCS/PEFC FMC. These findings could contribute to policymaking that encourages further adoption of the MTCS/PEFC FMC.

Keywords: forest managers, forest management certification, external drivers, internal drivers, Malaysian Timber Certification Scheme

INTRODUCTION

Forest and forest-based sectors are significant for Malaysia's environmental and socio-economic development. Recognising the importance of the forestry sector, Malaysia has committed to practising sustainable forest management, where forest and forest products are managed sustainably and legally (NRES 2024). Accordingly, forest certification has been introduced to strengthen further the SFM of its forests (MPIC 2024, NRES 2024). Forest certification has emerged in Malaysia since the end of the 1990s (Murughan et al. 2023, Murughan et al. 2024a). Forest certification was adopted to ensure that Malaysia's forest and forest-based sectors are sustainably and legally managed according to the defined environmental, social, and economic principles (Murughan et al. 2024a, Suryani et al. 2011). Saadun et al. (2019) stated that as the forest and forest-based sectors contributed significantly to the nation's socioeconomics, forest certification will remain an important part of these sectors.

The Malaysian Timber Certification Scheme/ Programme for the Endorsement (MTCS/PEFC)

is Malaysia's leading and largest certification provider (Murughan et al. 2023, Murughan et al. 2024a, Murughan et al. 2024b). In 2022, there were 5.35 million hectares of certified forest area, which covers 21 forest management units and nine forest plantation management units under MTCS/PEFC (MTCC 2022). This results in Malaysia being one of the top ten countries with the largest certified forest area globally under PEFC in 2022 (PEFC 2023). The MTCS/PEFC forest management certification (FMC) for natural forests was introduced in 2001, and the plantation forest certification was introduced in 2014 (MTCC 2001, 2014). There are MTCS/PEFC FMC-certified natural forests in Peninsular (i.e., Johor, Kedah, Negeri Sembilan, Pahang, Perak, Selangor and Terengganu), Sabah and Sarawak. However, there are MTCS/PEFC FMC-certified plantation forests in Sabah and Sarawak only. There are no MTCS/PEFC FMC-certified plantation forests in any of the states in the Peninsular.

Although the MTCS/PEFC FMC has been practised in Malaysia for over two decades, the

uptake remains low. It has been reported that, in the case of natural forests, although there are about 10.7 million hectares of permanent reserved forest, permanent forest, and permanent forest estate in Malaysia, a total of 5.7 million hectares are MTCS/PEFC-certified, which contributed about 53% in 2022 (NRES 2025, MTCC 2022). Meanwhile, in the case of plantation forests, although there is about 0.79 million hectares of the total area of plantation forest in the permanent reserved forest, permanent forest, and permanent forest estate in Malaysia, a total of 0.13 million hectares are MTCS/PEFC-certified, which contributed about 16% in 2022 (NRES 2025, MTCC 2022). In this case, the Malaysian Timber Certification Council (MTCC) has reported that the FMC uptake remains low and recognises an urgent need to increase the FMC uptake in Malaysia (MTCC 2018, MTCC 2019). Zainul Armir et al. (2020) reported a lack of MTCS/PEFC-certified forest management units, particularly in Peninsular. Similarly, PEFC has reported that the FMC uptake remains low in Southeast Asia, where only 3.5% of forests are certified (PEFC 2010). In this case, the low

uptake of the MTCS/PEFC FMC in Malaysia may be due to the potential significance of adopting the MTCS/PEFC FMC, which is yet to be uncovered. Thus, this study aims to explore the drivers of the MTCS/PEFC FMC adoption.

MATERIALS AND METHODS

In this study, a face-to-face semi-structured interview method was adopted. These semi-structured interview questions focused on exploring the drivers of both the external driver mechanisms (i.e., market, signalling, legal, and incentive) and internal driver mechanisms (i.e., moral and learning) to adopt the MTCS/PEFC FMC based on the six-driver model proposed by Murughan et al. (2024b) (Figure 1). These interview questions were developed based on the reviewed literature on the drivers of forest certification (Murughan et al. 2024b, Lombardo 2024, Lombardo et al. 2021, Zubizarreta et al. 2021, Galati et al. 2017, Faggi et al. 2014, Overdeest & Rickenbach 2006). The potential respondents were the MTCS/PEFC FMC certificate holders who hold valid certificates as

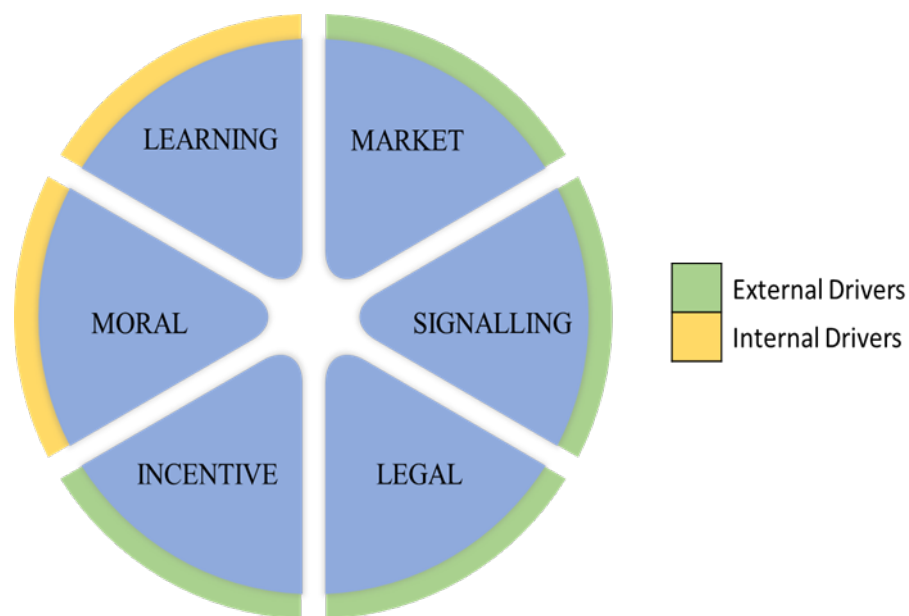


Figure 1 Six-driver Model in the Malaysian Timber Certification Scheme/Programme for the Endorsement forest management certification (MTCS/PEFC FMC)

Table 1 Drivers mechanism items for the MTCS/PEFC FMC

Mechanisms	Items
Market	<ul style="list-style-type: none"> • Access & Competitiveness • Price Premiums
Signalling	<ul style="list-style-type: none"> • Image • Attract Customers & Traceability
Legal	<ul style="list-style-type: none"> • International Forest-related laws • National Forest-related laws
Incentive	<ul style="list-style-type: none"> • Financial • Non-financial
Moral	<ul style="list-style-type: none"> • Concern on the Forest • Individual/Organisation Conscience
Learning	<ul style="list-style-type: none"> • Procedure Management • Documentation Management

of January 2023. The information on these valid certificate holders was obtained from the MTCC 2022 annual report (MTCC 2022). There are 15 valid MTCS/PEFC FMC certificate holders, seven from Peninsular, two from Sabah and six from Sarawak, who have participated in this study. This actual study was conducted between the second and fourth quarters of 2023, with the pilot study conducted in the fourth quarter of 2022. The data collected from these interviews were triangulated with data collected from interviews with government sectors, private sectors, and experts, as well as document reviews. This study was approved by the university research ethics committee (UPMTNCPI 2024).

RESULTS AND DISCUSSION

Market Driver

Forest certification has emerged as a potential instrument for market access, particularly in consumer countries such as Europe and North America (Cashore et al. 2004, Stevens et al. 1998, Overdevest & Rickenbach 2006). Thus, the producing countries adopted forest certification in access markets to these consumer countries (Lombardo et al. 2021, Tricallotis et al. 2019, Berock & Ongolo 2019, Iwanaga et al. 2019, Faggi et al. 2014, Espinoza & Dockry 2014, Ebeling & Yasue 2009, Espach 2006, Chen et al. 2011). As one of the major timber products producing countries, Malaysia has benefited from the MTCS/PEFC forest certification. Since the 2000s, the export of MTCS/PEFC-certified timber products has been mainly to Europe, which

recorded 73% of the total export of MTCS/PEFC-certified timber products globally. It was reported that the export of timber products to Europe is mainly from Peninsular, which recorded between 85% and 95% of the total export (MTIB 2024). Sarawak's major timber products export market is Japan, where it was recorded that about 50% of Sarawak's timber products were exported to Japan between 2018 and 2022 (STIDC 2024). It was recorded that during the same period, the export of MTCS/PEFC-certified timber products to Japan increased from 4.46% in 2018 to 41% in 2022 (MTCC 2018, MTCC 2022). Thus, the case of Peninsular and Sarawak explains that adopting FMC has provided market access, particularly to these consumer countries. Forest certification provides market competitiveness, in particular in the markets that require certified timber products (Rametsteiner & Simula 2003, Lewin et al. 2019, Zubizarreta et al. 2021, Wyatt & Bourgoin 2010, Halalisan et al. 2018, Tricallotis et al. 2019, Lombardo et al. 2021, Lombardo 2024). The export of the MTCS/PEFC-certified timber products was diverse. Between 2002 and 2011, the MTCS/PEFC-certified timber products were exported to developed consumer countries, mainly Europe, Oceania, and North America. However, between 2012 and 2021, the export markets were diverse, with the Asia region dominating the export markets, followed by the other markets in Europe, Africa, Oceania, the Caribbean, and North America.

The price premium is one of the main factors in the adoption of forest certification. Forest certification is costly, but fetching price premiums is uncertain in the marketplace (Chen

et al. 2010). In a case study conducted by Wolff and Schweinle (2022), it was reported that 56% reported price premiums, and 44% reported no price premiums in adopting forest certification. In this case, it was mentioned that there are price premiums when trading MTCS/PEFC-certified timber products with European countries. Similarly, in Nepal, price premiums were between 50% and 150% for certified timber products traded to Europe and the United States (Acharya et al. 2015). In Vietnam, certified timber products fetched price premiums of 25% for export to the United States, Europe and Japan (Minh & Tuan 2016). While price premiums are available, it is not more than 10%, depending on the buyer's side. Similarly, in Slovakia, the price premiums recorded are between 1% and 10% (Palus et al. 2018a). On the contrary, it was mentioned that there are no price premiums when trading MTCS/PEFC-certified timber products. Similarly, the absence of price premiums has been reported in Europe, North America, Africa and South America (Gafo Gómez-Zamalloa et al. 2011, Wolff & Schweinle 2022). Thus, if limited price premiums are available in developed countries such as Europe and North America, it is logical to accept that there are either limited or no price premiums for certified timber products from producing countries. In fact, the price premium is hard to prove in the forest certification (Chen et al. 2010).

Signalling Driver

The image is important in adopting forest certification as it provides assurance and acceptance of good corporate governance of forest-related businesses to both the consumers and related stakeholders such as government, environmental NGOs, and international businesses (Zubizarreta et al. 2021, Lombardo et al. 2021). In this case, the image aspect is essential, as the Malaysian forestry sector has been criticised for forest management and timber trade both at the international and national levels, mainly in the 1980s and 1990s (Mohamad 1996). Forest certification was initially developed to address illegal logging, deforestation and forest degradation, mainly in developing countries, and to counter the anti-tropical timber products campaigns and boycotts in developed countries, mainly in Europe and the United States (McDermott et al. 2023, Cashore

et al. 2010, Cashore et al. 2004, Lewark 2022, Mohamad 1996). These forest-related concerns in developing countries, including Malaysia, have not only impacted the timber trade markets but have also tarnished the image of these countries (Mohamad 1996). Thus, while Malaysia has been practising sustainable forest management to manage its forest, adopting forest certification is a potential tool to address these forest-related concerns. The government has acted accordingly to adopt the MTCS/PEFC forest certification at the national level (Chew et al. 2009, Chew et al. 2019). The government foresaw that the MTCS/PEFC FMC could further strengthen sustainable forest management practices and convince forest-related stakeholders such as consumers, environmental NGOs, and others that Malaysia's forest and forest products produced are managed sustainably and legally. For forest-related businesses, adopting FMC has become important not only for trading with these developed countries but also for recovering and upholding the image of their companies. Several studies reported that companies both in developed and developing countries adopt forest certification to improve their corporate image and credibility among the government, consumers, environmental NGOs and others (Crow & Danks 2010, Overdeest & Rickenbach 2006, Takahashi et al. 2003, Gulbrandsen 2005). In fact, these companies adopted forest certification to prove that they are committed to forest-related concerns (Overdeest & Rickenbach 2006, Araujo et al. 2009, Chen et al. 2011, Espinoza et al. 2012, Palus et al. 2018, Basso et al. 2018, Halalisan et al. 2019, Galati et al. 2019).

Apart from gaining a positive image, adopting forest certification attracts customers and provides traceability assurance. Several research studies reported that a positive image gained by adopting forest certification would attract customers in existing and new markets (Berock & Ongolo 2019, Palus et al. 2018a, Palus et al. 2018b, Misiune 2018). In this case, the MTCS/PEFC-certified timber products were exported mainly to the developed countries' markets, mainly in Europe in the 2000s and to new markets, mainly in Asia in the 2010s and 2020s. The export market and export volume of the MTCS/PEFC-certified timber products increased more than triple between 2010 and

2022, from 22 export markets to 72 export markets and from 72,000 m³ export volume in 2010 to 263,000 m³ export volume in 2020, respectively (MTCC 2010, MTCC 2020). This shows that while there is strong trade with existing European countries, there is trade to potential new markets in Asia.

Legal Driver

The international forest-related laws, namely, the Australian Illegal Logging Prohibition Act, the European Union Timber Regulation, the US Lacey Act, the Japan Clean Wood Act, and the Republic of Korea Act on the Sustainable Use of Timbers, and others have emerged since the 2010s (Leipold et al. 2016, DAWRA 2023, EC 2023, KFS 2023, MAFF 2023, USC 2023). These laws prohibit the trade of illegal timber and timber products into their respective market and impose penalties for violating the act (Leipold et al. 2016, DAWRA 2023, EC 2023, KFS 2023, MAFF 2023, USC 2023). In this case, forest certification has emerged as a potential tool to provide due diligence that timber and timber products are sourced from a sustainably and legally managed forest (Durst et al. 2006, Palus et al. 2017, Palus et al. 2018a, Palus et al. 2018b). As a result, forest certification has emerged as the legal compliance to fulfil these mandatory international forest-related laws (Zubizarreta et al. 2021).

Since the introduction of these forest-related laws in the 2010s, there has been a steady rise in the adoption of the MTCS/PEFC FMC. For instance, the MTCS/PEFC-certified forest area increased from 4.2 million hectares in 2010 to 5.8 million hectares in 2022 (MTCC 2010, 2022). Similarly, the number of MTCS/PEFC FMC certificate holders has increased from 8 in 2010 to 37 in 2022 (MTCC 2010, MTCC 2022). In terms of export markets for MTCS/PEFC-certified timber products, the export markets are dominated by Europe, the United States, Australia and Japan. Although these countries have enforced international forest-related laws, the export of MTCS/PEFC-certified timber products is increasing. For instance, Europe, the United States and Australia have remained in the top ten markets between 2010 and 2022 (MTCC 2022). Japan has emerged in the top ten export market for MTCS/PEFC-certified timber products between 2018 and 2022 and is the largest market for MTCS/PEFC-certified timber

products in 2021 and 2022 consecutively (MTCC 2018, MTCC 2019a, MTCC 2020, MTCC 2021a, MTCC 2022). This shows that although these developed countries imposed international forest-related laws, exports of MTCS/PEFC-certified timber products to these developed countries is constant. This results from the acceptance of the MTCS/PEFC forest certification to prove the sustainability and legality of certified timber products from Malaysia.

The governments, mainly in Europe, North America, and Asia, adopted the public timber procurement policy, which requires the national and local government agencies to procure timber products that are produced sustainably and legally for the goods, services and public works (Brack & Saunders 2004, Simula 2006, Brack 2014, Martin & Ghazali 2015). As a result, as the forest certification standards prove the sustainability and legality of timber products, it has been accepted as a minimum criterion to fulfil this public timber procurement policy (Brack & Saunders 2004, Simula 2006, Brack 2014, Martin & Ghazali 2015). In the 2000s, European countries such as the Netherlands, United Kingdom, Belgium, France and Germany adopted the public procurement policy (Simula 2006). In this case, these countries have been the top markets for MTCS/PEFC-certified timber products, with more than 70% of exports since 2002 (Chew et al. 2009, Chew et al. 2019). Meanwhile, in the 2010s, 26 countries, mainly in Europe, Asia, and Oceania, adopted the public timber procurement policy (White 2019, Brack 2014). In this case, the exports of the MTCS/PEFC-certified timber products recorded were mainly to Japan, with Japan having emerged in the top five markets since 2018 (MTCC 2018). Similarly, Australia has emerged in the top ten markets since 2010 (MTCC 2010).

Apart from the international forest-related laws, national forest-related laws are important for adopting forest certification. Several governments, such as Indonesia, Guatemala, and Russia, have enforced mandatory forest certification in their respective countries (Maryudi et al. 2017, Setyowati & McDermott 2016, Carrera et al. 2006, McGinley & Cabbage 2012, Strakhov & Miettinen 2001, Nilsson 2001). In this case, the Sarawak state government has enforced mandatory FMC. The Sarawak state government mandated FMC for all long-term forest timber license holders with long-term

forest timber licence holders in Sarawak to obtain FMC by 2025 in 2018 (Semilan et al. 2022, FDS 2024b). As a result, there has been a steady increase in the MTCS/PEFC-certified forest area in Sarawak since then. For instance, the MTCS/PEFC-certified natural forest area has been increasing steadily since 2014, from 0.08 million hectares in 2014 to 1.5 million hectares in 2022 (MTCC 2014, MTCC 2022). Similarly, the MTCS/PEFC-certified plantation forest area has increased from 0.01 million hectares in 2014 to 0.10 million hectares in 2022 (MTCC 2014, MTCC 2022). In terms of the export market for Sarawak-made timber products, Japan has been the major export market. For instance, between 2018 and 2023, Japan emerged as the major market for Sarawak with an export market share between 50% and 60% annually (STIDC 2018, STIDC 2019, STIDC 2020, STIDC 2021, STIDC 2022, STIDC 2023). As a result, adopting mandatory FMC in Sarawak has increased MTCS/PEFC-certified forest areas and the export of MTCS/PEFC-certified timber products to developed countries, particularly Japan. This reflects that national-level forest-related laws, and in this case, a state-level forest-related law, are pivotal to adopting FMC in Malaysia.

Incentive Driver

Financial and non-financial incentives are important for forest certification (Nussbaum & Simula 2005). The financial incentives include financial and tax support from the government and private sectors. Meanwhile, the non-financial incentives include capacity building, training and development programs provided by the government, private, and certification providers. The cost is a significant concern in adopting forest certification (Nussbaum & Simula 2013, Nussbaum & Simula 2005, Ehrenberg-Azcarate & Pena-Claros 2020). In this case, recognising the concern about the costs of adopting FMC, the government has adopted several initiatives that could increase the uptake of the MTCS/PEFC FMC. In Peninsular, the Forestry Department Peninsular Malaysia and the respective state forestry departments are involved in the MTCS/PEFC FMC, where the respective state forestry departments are the certificate holders. The federal government provides financial support for forest certification costs for these MTCS/PEFC FMC certificate holders through an

endowment fund (MTCC 2000). This financial support from the federal government since 2000 to the respective state forestry departments in Peninsular to adopt and maintain the MTCS/PEFC FMC has resulted in Peninsular having the largest certified forest area under the MTCS/PEFC FMC. Meanwhile, in Sarawak, the state government provides financial support through cut-rate forest timber licences and royalties for log fees for certified sustainable forest management certificate holders. For instance, certified sustainable forest management, including the MTCS/PEFC FMC certificate holders, pays less for forest timber license renewals than pre-sustainable FMC and non-certified sustainable forest management holders (SFO 2015). These MTCS/PEFC FMC certificate holders also pay lower rates in royalties for export logs. (SFO 2015). Apart from that, the Sarawak Timber Association provides financial support to its members who have obtained the MTCS/PEFC FMC since 2007, where this financial support depends on the size of certified sustainable forest management under the MTCS/PEFC FMC (STA 2007). The Inland Revenue Board also provides tax deductions for the MTCS/PEFC FMC certificate holders. These MTCS/PEFC FMC certificate holders from Peninsular, Sabah and Sarawak, where these certificate holders are eligible for tax deductions double the amount spent on expenses to obtain and maintain FMC by Paragraph 34(6) (ma) of the Income Tax Act 1967 (LOM 2021). For instance, a valid MTCS/PEFC FMC certificate holder who registered for certification with the Standards and Industrial Research Institute of Malaysia is eligible for tax deductions double the amount spent on application, annual and assessment fees for obtaining and maintaining FMC under this income tax act (SIRIM 2024).

Capacity building and training and development programs are important elements of the forest management standard (Nussbaum & Simula 2005). Training is important for forest owners to adopt and maintain forest certification (Cubbage et al. 2009, Moore et al. 2012, Jaung et al. 2016a, Jaung et al. 2016b). In this case, the MTCC, the certification provider of the MTCS/PEFC, recognises the importance of training as it is well stipulated in the MTCS ST 1002:2021 Malaysian Criteria and Indicators for Sustainable Forest Management standard (MTCC 2021b). Thus, the MTCC has been conducting training

and development programs for the auditors, the state forestry departments, and FMU managers. These training and development programs include auditor training and updating MTCS/PEFC standards. Similarly, several researchers have stated that forest certification providers, for instance, PEFC and FSC, both in developed and developing countries do provide training programs for auditors and certificate holders (Tham et al. 2020, Cabbage et al. 2009, WWF 2005, Butterfield et al. 2005, Eba' Aryi & Simula 2002, Nussbaum & Simula 2005). Apart from that, the longer tenure for FMC is seen as a non-financial incentive. In this case, the Sabah government introduced the Sustainable Forest Management License Agreements (SFMLA) in 1997, a partnership between the government and private sector to manage forests sustainably (Atin & Lintangah 2023, Jaini et al. 2015, Latip & Badarulzaman 2014). The SFMLA provides a long-term guarantee of 100 years on the forest land tenure, where this long-term duration covers a typical two logging cycles, which is seen as an incentive for the SFMLA holders (Wells et al. 2008, Ng et al. 2022). Thus, this approach by the Sabah government to provide a long-term guarantee of 100 years on the forest land tenure to the private companies is a potential non-financial incentive. Similarly, research has found a relationship between tenure and forest certification, where landowners with longer tenure are anticipated to adopt and practise FMC compared to short-tenure landowners (Bensel 2001, Chen & Innes 2013, Tian et al. 2018). Longer tenure forms allow landowners to value both forests and benefits from the land over the years (Robinson et al. 2014). As a result, recognising the importance of FMC, there is a need to adopt longer-tenure forest management as in the case of Sabah.

Moral Driver

The moral driver is where the forest managers are concerned about forest-related issues and thus have adopted FMC to address these issues (Lombardo et al. 2021). This is a principled intention that the forest managers themselves have adopted. Several studies have stated that environmental and social benefits prevail over economic benefits in adopting FMC (Carlsen et al. 2012, Galati et al. 2017, Faggi et al. 2014). In this case, the concern over the forest and forest

benefits is reflected through adopting the MTCS/PEFC FMC. The government and businesses know that FMC may lead to responsible and sustainable forest management. Accordingly, the FDPM have implemented the MTCS/PEFC FMC in the states of Peninsular since the 2000s (Chew et al. 2009). Similarly, the Sarawak state government has had mandatory FMC since 2018 (Semilan et al. 2022). Apart from the government, some timber companies, mainly in Sarawak, have voluntarily adopted FMC before the Sarawak government's mandatory adoption in 2018. These commitments, both by the government and businesses, to sustainably manage the forest for the future are reflected through the adoption of forest certification. This is similar to the case of Carlsen et al. (2012) and Galati et al. (2017), where FMC is adopted to preserve forests for the future.

While there are studies that state forest managers are more concerned about the economic benefits than the environmental and social benefits (Lombardo et al. 2021), this is not the case in Malaysia. For instance, in Sarawak's case, forest resource production has dropped significantly from 12 million m³ in 2005 to 2.4 million m³ in 2020 (FDS 2005, FDS 2020). There was a significant drop since the introduction of mandatory FMC in Sarawak, from 5.02 million m³ in 2018 to 2.41 million m³ in 2020 (FDS 2018, FDS 2020). However, during the same period, the MTCS/PEFC-certified natural forest area increased significantly, from 0.56 million hectares in 2018 to 1.27 million hectares in 2020 (MTCC 2018, MTCC 2020). Similarly, the MTCS/PEFC-certified plantation forest area has also increased significantly, from 75,493 hectares in 2018 to 94,966 hectares in 2020 (MTCC 2018, MTCC 2020). Meanwhile, in terms of forest revenue collected, there was a significant drop from RM760 million in 2005 to RM335 million in 2020 (FDS 2005, FDS 2020). There was a significant drop since the introduction of mandatory FMC in Sarawak, from RM626 million in 2018 to RM334 million in 2020 (FDS 2018, FDS 2020). Although the forest revenue collection has dropped, the Sarawak government provides financial incentives through cut-rate timber licenses and royalties for logs for export (SFO 2015). This is similar to the case of Peninsular and Sabah. In Peninsular, the production of forest resources has dropped significantly from 4.2 million m³ in 2007 to 2.7 million m³ in 2022 (FDPM 2007, FDPM

2022). In Sabah, forest resource production has dropped significantly from 5.3 million m³ in 2006 to 0.82 million m³ in 2023 (SFD 2006, SFD 2023). The forest revenue of Sabah has dropped significantly from RM505 million in 2006 to RM155 million in 2023 (SFD 2006, SFD 2023). However, the MTCS/PEFC FMC-certified area has increased in Peninsular and Sabah since the 2000s. Although forest resource production and revenue collection have decreased significantly in Peninsular, Sabah and Sarawak, these state governments continue to adopt and practise FMC. Moreover, these state governments provide financial incentives to the MTCS/PEFC FMC certificate holders. This reflects the commitment of these state governments to adopt FMC not merely for economic benefit but also for environmental and social benefits.

Apart from the concern about forest and environmental matters, the conscience of individuals and/or organisations to adopt FMC. In Sarawak, eight FMUs had been certified under the MTCS/PEFC FMC before the Sarawak government's mandatory adoption of the FMC in 2018. This shows that these timber companies adopted the MTCS/PEFC FMC as part of their forest management. These timber companies saw the importance of FMC in terms of environmental and social aspects compared to economic aspects. This is similar to the case of Vlosky et al. (2009), where timber companies place environmental aspects first compared to sales and markets. Faggi et al. (2014) and Galati et al. (2017) mentioned that personal intention and conscience are more important than other aspects. Similarly, in Peninsular, the Selangor State Forestry Department has imposed 25-year moratorium on logging in its permanent reserve forest since 2010 (SSFD 2024). Although there are no logging activities in Selangor, the MTCS/PEFC FMC in Selangor has been valid since 2001 (MTCC 2001). The certified forest area under the MTCS/PEFC FMC in Selangor has been increasing since 2001; there was a total of 235,000 hectares in 2001, which increased to 238,000 hectares in 2021 (MTCC 2001, MTCC 2021a). The Selangor state government has stated that this is an initiative by the state government to value the environmental aspects, where this moratorium could contribute positively to the environment (SSFD 2022). This shows that the importance of FMC has been placed high in managing the forest, including during the

moratorium period, where no logging activities have been carried out. A similar case has been reported by Zubizarreta et al. (2021), where timber companies with forest certification and no export activities are concerned about the environmental aspect compared to other aspects.

Learning Driver

The learning driver is important in improving forest management procedure and documentation management (Overdeest & Rickenbach 2006, Cashore et al. 2005, Nussbaum & Simula 2005, Dyke et al. 2005, Araujo et al. 2009). Several studies have stated that adopting FMC has improved procedure management (Overdeest & Rickenbach 2006, Araujo et al. 2009, Zubizarreta et al. 2021). In this case, adopting the MTCS/PEFC FMC will lead to audits (MTCC, 2024). Thus, the MTCS/PEFC FMC certificate holders must improve their procedure management by the standard. Zubizarreta et al. (2021) stated that audits require companies to adopt changes in procedure management. Thus, the MTCS/PEFC FMC certificate holders adopt changes to improve their procedure management to comply with the standards and maintain their FMC. Similarly, the MTCS/PEFC FMC standards will be updated occasionally to strengthen and fulfil the stakeholders' demands. Thus, this standard update enables these certificate holders to improve their procedure management at times. As a result, this will provide continuous learning regarding procedure management for the MTCS/PEFC FMC holders.

Apart from that, documentation management has also been improved. Certification requires detailed documentation (Elliott 2000). In the case of FMC, proper documentation is important as it will be used to convince the auditors during the audits (Eden 2009). Furthermore, proper documentation is important prior to publication, as the audit reports will be made available online to the public (Eden 2009). This is also reflected in MTCS/PEFC's standard, where forest managers should document all the information and retain documents as evidence for audits (MTCC 2021). This documentation management complements traceability, where the traceability aspect of forest certification is to provide information about forest products to the end user. In the 1990s, forest certification emerged as one of the traceability methods

(Tonouewa et al. 2024, Teketay et al. 2016). For instance, under the MTCS/PEFC standard, tracing the origin of each forest product leaving the certified area is required (MTCC 2021). Therefore, all relevant information must be documented to fulfil this requirement. Consequently, forest managers are required to prepare and maintain proper and detailed documentation.

CONCLUSION

Malaysia has adopted forest certification to ensure that its forest and forest-based sectors are managed sustainably and legally by environmental, social, and economic principles since the end of the 1990s. Accordingly, Malaysia's forestry sector has benefited from adopting MTCS/PEFC FMC since then. The findings revealed that both the external (i.e., market, signalling, legal, and incentive) and internal (i.e., moral and learning) drivers drive the adoption of the MTCS/PEFC FMC. The findings of this study can be beneficial for many. This study may enable non-certified forest-related companies to make the best and most informed decisions when adopting the MTCS/PEFC FMC to manage their forests. This study is significant for the government and private sectors in developing potential policies and plans to strengthen and further upsurge the MTCS/PEFC FMC uptake. Future research on potential driver/s to adopt FMC should be conducted to further research on the drivers of forest certification.

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