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THE MEDIATING ROLE OF SERVANT LEADERSHIP IN PREDICTING GREEN MANAGEMENT PRACTICES: A PRELIMINARY STUDY

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ABSTRACT

Green manufacturing practices (GMP) are promoted by the United Nations through an effort known as Sustainable Development Goals (SDGs), which has been welcomed by Malaysia to address global environmental problems, with manufacturing sectors becoming the primary focus, in line with the National Policy goals to enhance

the capacity of the manufacturing sector by 2025. However, Malaysia's green commitment is less encouraging globally, as most manufacturers are still struggling to implement GMP due to weak leadership, resulting in low acceptance within the organization. Servant leadership is proposed as a mediator to help manufacturers implement GMP effectively, where this leadership is less concerned with the context of green practices in Malaysia. In this paper, the influential factors of GMP implementation will also be identified. A total of 40 factory managers responded to the survey used in a pilot study. The initial results show that the most influential factor is law enforcement, based on mean score, followed by proactive communication and technology advancement. Meanwhile, servant leadership did not mediate the relationships between the business environment and organizational factors, except for individual factors and GMP, as employees are empowered to be creative in their own ways. This study offers new perspectives to manufacturers who intend to maintain their commitment towards GMP.

Keywords: Business environment factors, organizational factors, individual factors, servant leadership, green manufacturing practices.

INTRODUCTION

Advanced industrial development has changed consumer needs in the market, contributing to global warming and disrupting the well-being and harmony of everyday life (Altenburg et al., 2017; Biernacki, 2015). In response, GMP were introduced to minimize uncontrolled production activities that disturb the eco-system balance worldwide (Hami et al., 2018; Ramayah et al., 2013). The United Nations has stepped forward to encourage business practitioners to prioritize environmental concerns through SDGs (Yong et al., 2019), attracting many multinational companies to actively engage in minimizing environmental issues. For example, Ford Motor Company introduced the 'Partnership for A Cleaner Environment' or PACE Programs to raise awareness of green practices among suppliers and employees (Ford Motor Company, 2019). Such initiatives not only address environmental problems but also improve community living standards through environmentally-friendly employment and enhancing companies' competitiveness in the global market (Ekins et al., 2019).

Malaysia also participates in the United Nations' recommendations to address environmental problems by focusing on several key elements of the SDGs, including SDG 3, 6, 7, 8, 11, 12 and 13 (Lanang et al., 2018; Yong et al., 2019). The manufacturing sector has been selected to lead these elements due to its significant impact on both economic development and environmental issues (Ghazali Hassan et al., 2015; Ramayah et al., 2013). This aligns with Malaysia's new national policy goals aimed at transforming the manufacturing sector towards more sustainable economic development, with a targeted increase of 54 percent or RM392 billion by 2025. Focusing on the manufacturing sector can add value to the nation's development through efficient and high-tech management (Leong, 2018; Xuxin, 2018).

However, Malaysia's commitment to green practices still remains moderate. International reports show that Malaysia still lags behind neighbouring countries, especially Singapore, in implementing green practices, with only an 8.5 percent increase in 2018, which is considered weak (The Global Green Economy Index Report, 2016, 2018). The inconsistency in Malaysia's commitment to green practices has been highlighted as irregular or slow (MIT Technology Review, 2021). Local studies also reported that many manufacturers in Malaysia struggle to implement green practices, especially green manufacturing practices, due to weaknesses in the company's leadership system (Abdullah et al., 2016; Aziz et al., 2018; Hami et al., 2018), despite various government initiatives (Chu, 2019; GreenTech Malaysia, 2020). This leads to low acceptance of GMP and difficulties in generating innovative ideas for implementation (Low et al., 2015; Yacob et al., 2017). Over 50 percent of factory managers, particularly in the electrical and electronics manufacturing sector, lack awareness of the importance of GMP in achieving good company performance, attributing this to a lack of green knowledge and the perception that green practices requires significant commitments of time, effort, and resources (Low et al., 2015; Yacob et al., 2018). Additionally, most manufacturers are profit-oriented organizations (Aziz et al., 2018).

The significance of this study lies in providing empirical knowledge about leadership that can help manufacturers in dealing with new change practices such as GMP, especially by acknowledging employees' involvement in producing better green performance and enhancing competitiveness in the manufacturing sector. Therefore,

this study proposes servant leadership, as it has garnered attention for effectively implementing new changes by prioritizing followers' interests (which are employees' interests) over leaders' own interests (Tanno & Banner, 2018) and is less highlighted in the Malaysian context, particularly in green initiatives. Hence, the study aims to provide initial results on the level of mediation of servant leadership to implement GMP in the Malaysian manufacturing industry, as it is incongruent with GMP (Ambali et al., 2011; Rashid et al., 2017; Singh et al., 2020), along with the level of influence on factors encouraging manufacturers to adopt GMP in Malaysia.

LITERATURE REVIEW

Green Manufacturing Concept

The rapid development of the manufacturing sector worldwide has caught the attention of the international community due to its increasing negative impacts on the environment, including uncontrolled pollution, waste, and exploitation of natural resources (Ahmad et al., 2019). Consequently, the green manufacturing concept has been introduced as an immediate response to address environmental issues by transitioning manufacturing activities from traditional approaches to sustainable ones, aiming to protect the environment while balancing economic growth and social responsibility (D'Angelo et al., 2022; Hami et al., 2018). Therefore, GMP have provided a platform for manufacturers, including those in Malaysia, to promote and implement promising practices that demonstrate environmental responsibility through production.

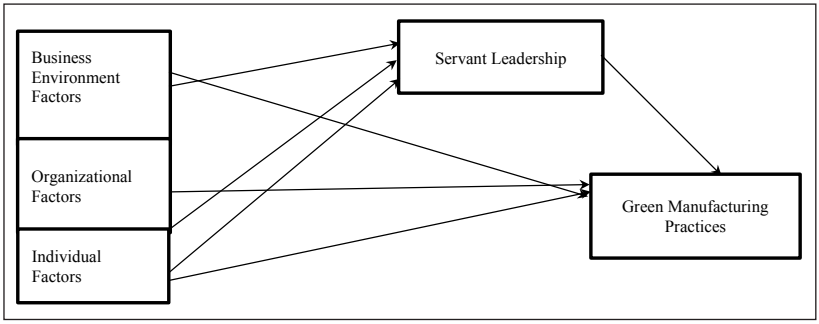
Theory of Change Equation and Resource-Based View

This study employs Beckhard and Harris' change equation as the main theory and the resource-based view (RBV) as a supporting theory. Based on the perspective of the main theory, three main principles, namely the personal basis (principal 1), the change itself (principal 2), and the organizational environment (principal 3), are associated with the new change (Čudanov et al., 2019). GMP is considered a new change (Habidin et al., 2015; Nordin et al., 2015), and this study developed the variables of the study based on three principles: the

business environment factors relating to Principal 2, the organizational factors related to Principal 3, and the individual factors related to Principal 1. The inclusion of servant leadership as a mediator was developed based on the similarity of both theories, wherein the change equation and RBV emphasize that effective leadership is required for an organization to implement a new change (Barney & Mackey, 2016; Bruijl, 2018; Čudanov et al., 2019; Malik et al., 2020). Hence, servant leadership is considered an important aspect to ensure that GMP can be proactively implemented by Malaysian manufacturers. Upon the understanding of both theories, the research framework of this study is illustrated as follows.

Figure 1

Research Framework



Green Manufacturing Practices

Green manufacturing practices (GMP) are methods aimed at minimizing environmental problems through production activities, such as reducing energy and water usage and reducing manufacturing costs, particularly raw materials, through recycling and other means (Ghazilla et al., 2015). It is believed that GMP can enhance the capabilities of manufacturing companies by maintaining good performance and increasing production while effectively managing existing resources (Habidin et al., 2015). This aligns with the goals of implementing GMP, which include achieving optimal production levels while being environmentally friendly, balancing sustainability performance in terms of environmental, social, and economic aspects, and complying with government regulations, particularly

environmental laws, aimed at addressing environmental issues through stricter enforcement (Abdul-Rashid et al., 2017; Aziz et al., 2018; Habidin et al., 2017; 2020; Hami et al., 2018).

Factors Influencing the Implementation of Green Manufacturing Practices

This study identified several key factors influencing the implementation of GMP among manufacturers in Malaysia. These factors have been classified into three categories: the business environment, organizations, and individuals. These factors were prioritized by adopting the principals of change equation and RBV, as well as insights from local researchers in previous studies.

Business Environment Factors

The business environment encompasses factors that influence manufacturers' outcome in implementing GMPs such as competition, law enforcement, and technological advances. These three dimensions have been confirmed to strongly motivate manufacturers in Malaysia to implement GMP (Abdul-Rashid et al., 2017; Ali et al., 2019; Ghazilla et al., 2015; Ho et al., 2017; Nor Aziati et al., 2016). More than 60 percent of manufacturers perceive that GMP could enhance their business performance by establishing a respected corporate image as competitiveness levels increase (Abdul-Rashid et al., 2017; Hami et al., 2018; Ho et al., 2017), particularly when they are certified with ISO 14001 for environmental management systems (Aziz et al., 2018; Ho et al., 2017). Additionally, over 70 percent of manufacturers agree that enforcing environmental laws help them remain vigilant about legal requirements for their businesses (Ho et al., 2017) thereby preventing environmental problems such as pollution and enhancing their commitment to environmental protection as a core aspect of their organizational culture (Abdul-Rashid et al., 2017; Abdullah et al., 2017; Wæraas & Ihlen, 2009). Finally, adopting advanced technologies especially in green practices, has been reported to improve company production performance, especially when cleaner technologies are employed in production processes. This can also help manufacturers reduce manufacturing costs for efficient production processes (Masoumik et al., 2015; Mokhtar et al., 2016; Nor Aziati et al., 2016; Sulong et al., 2015; Tran & Herzig, 2020). Based on the arguments presented, the following hypothesis is proposed:

H_1: Business environment factors significantly influences the implementation of GMP among Malaysian manufacturers.

Organizational Factors

Organizational factors consist of two dimensions validated by previous studies: green skilled employees and proactive communications. Green-skilled employees are a crucial element that every manufacturing company aims to have to effectively implement GMP. Previous studies have reported that employees certified with green skills and knowledge can enhance the competitiveness of the company, particularly in Research and Development (R&D) (Abdullah et al., 2016; Cedefop OECD, 2015; Malik et al., 2020). Having these certified employees can also help manufacturers address the issue of more than 50 percent of employees lacking green knowledge and skills, which are essential for effective GMP implementation (Abdullah et al., 2016; Nordin et al., 2015). Additionally, a clear vision of the green concept should be communicated through proactive communications. Researchers have claimed that effective communication between leaders and subordinates can facilitate the effective implementation of new changes, especially GMP, as it demonstrates management support for GMP implementation (Low et al., 2015). Providing detailed information about the new green vision is essential to promote transparency and gain trust and support from employees within the organization (Alsaad, 2016; Juan et al., 2018; Mendoza-Fong et al., 2018; Radzi & Othman, 2016). Based on this argument, the following hypothesis is proposed:

H_2 : Organizational factors significantly influence the implementation of GMP among Malaysian manufacturers.

Individual Factors

This factor pertains to organizational members who possess environmental values as a means of supporting green practices (Bansal & Roth, 2000). It consists of two important dimensions: employee perceptions and employee attitudes. Employees often perceive green practices as promising business strategies that can sustain the company's performance for long-term survival. The innovative ideas that employees contribute can help develop more structured

implementation plans for the company to mitigate environmental problems, especially in production processes (Jia et al., 2018; Liphadzi & Vermaak, 2015; Nieves & Quintana, 2016). Employees' passion for green practices is considered important for generating creative ideas, reflecting their loyalty and willingness to assist manufacturers in implementing GMP more effectively. In other words, increasing their commitment to these practices (Jia et al., 2018; Low et al., 2015; Yacob et al., 2018). Regarding employee attitudes, researchers claim that employees with positive attitudes toward green practices are more likely to be proactive in assisting their employers in GMP implementation (Sharma, 2014). However, employees' attitudes can disrupt effective GMP implementation if they do not receive fair treatment from their employers in managing and implementing new changes, leading to either high or low commitment to new assignments (Altaf et al., 2019; Nudzor & Ansah, 2017). Employees who are proactive in GMP implementation are engaging in pro-environmental behaviours, exhibiting environmental responsibility through their knowledge and skills (Afsar et al., 2018; Islam & Managi, 2019; Robertson & Barling, 2013). When employees exhibit this behaviour during implementation, they perform their new duties better and make better decisions without ignoring environmental concerns (Jia et al., 2018; Zhang et al., 2019). Based on this argument, this study proposes the following hypothesis:

H_3: Individual factors significantly influence the implementation of GMP among Malaysian manufacturers.

Servant Leadership as Mediator

Servant leadership is defined as leadership that prioritizes the interests of followers over the leader's own interests (Ingram, 2016). From a management perspective, a leader should foster unity and trust among employees, as well as possess emotional and intellectual understanding to ensure positive acceptance of new changes (Eide et al., 2020; Low et al., 2015). Researchers have noted that servant leaders must possess several characteristics such as humility, stewardship, authenticity, accountability, empowerment, courage, forgiveness, and stepping back. These characteristics can help employees become knowledgeable, resourceful, confident, and skilful (Brohi et al., 2018; Latiff et al., 2017; Wong et al., 2019).

As servant leaders, they must empower employees with empathy, social responsibility, and ethics to foster stronger relationships (Brohi et al., 2018; Gašková, J., 2020). Being a role model is essential to motivate employees to be dedicated and resilient in the workplace, thereby enhancing their involvement (Coetzer et al., 2017; Gandolfi & Stone, 2018; Gašková, J., 2020). In the context of green practices, servant leaders should encourage employees to appreciate the environment by promoting environmental values, thereby contributing to the company's sustainability growth (Tuan, 2019). Environmental values can be promoted through enhancing employees' pro-environmental behaviours, not only improving the company's sustainability performance, particularly in corporate social responsibility but also prioritizing employees' welfare to enhance their performance (Afsar et al., 2018; Brohi et al., 2018; Gašková, J., 2020; Wong et al., 2019).

Mediating Relationships of Servant Leadership in Implementing GMP

Business Environment, Servant Leadership, and GMP

In practising green manufacturing, servant leaders should lead employees by setting an example, such as conducting business activities ethically and professionally, to persuade employees to do the same. This demonstrates authenticity, fostering honesty and strong integrity, and respect for their profession among employees (Latiff et al., 2017; Tanno & Banner, 2018; Thao & Kang, 2020). Additionally, servant leaders should encourage employees to remain humble even when competing with other companies in the market; avoiding superior complexes (Opoku et al., 2019; Tanno & Banner, 2018). Maintaining humility fosters respect within the organization and creates a healthy competitive environment, especially when larger-sized manufacturers collaborate with smaller manufacturers to implement GMP through joint-ventures (Aziz et al., 2018; Hernández-Perlines & Araya-Castillo, 2020; Opoku et al., 2019; Weng et al., 2015).

Furthermore, servant leaders must encourage employees to prioritize serving the interests of the public and be mindful of environmental sensitivity (Ambali et al., 2011; Hernández-Perlines & Araya-Castillo, 2020; Tuan, 2019). Compliance with environmental laws not only

prevents penalties but also demonstrates the company's responsibility in valuing public interests through regulations (Eva et al., 2019; Latiff et al., 2017; Tanno & Banner, 2018). In green manufacturing practices, advanced technologies are essential investments for producing environmentally-friendly products. Employee involvement is crucial for the company's survival in a competitive market (Hami et al., 2018; Nor Aziati et al., 2016; Opoku et al., 2019). In this regard, servant leaders must really understand employees' capabilities to handle advanced situations. Empowering employees to make decisions fosters innovation in conducting business operations. Although mistakes may occur, they provide learning opportunities and enhance employees' appreciation by servant leaders (Latiff et al., 2017; Rashid et al., 2017; Thao & Kang, 2020). Hence, this study formulated the following hypothesis:

H_4: Servant leadership significantly mediates the relationship between business environment factors and GMP.

Organizational, Servant Leadership, and GMP

Having highly skilled employees in managing green practices gives the company a competitive edge in the market. To attract such talented employees, recruitment and training programs should be conducted inclusively. As a servant leader, transparency during the interview session is crucial, demonstrating ethical behaviours by leaders to potential employees and showing the company's commitment to morality and integrity in conducting new business activities related to green manufacturing practices (Afsar et al., 2018; Tuan, 2019). Meanwhile, conducting proper training programs is essential to enhance the knowledge and skills of existing employees showing concern their development especially in improving their understanding of green practices to achieve new environmental goals. For example, employees can be empowered to acquire remarkable capabilities such as technological capability (Otero-Neira et al., 2016; Salisu & Abu Bakar, 2019) to manage green manufacturing practices effectively. In this way, servant leaders can create a win-win solution for the company by prioritizing employees' needs before making a significant impact on green manufacturing implementation (Afsar et al., 2018; Karatepe et al., 2018; Otero-Neira et al., 2016; Ozyilmaz & Cicek, 2015).

Furthermore, servant leaders should ensure that new information about green goals is shared honestly and transparently with employees to elicit their full cooperation (Alsaad, 2016; Hernández-Perlines & Araya-Castillo, 2020; Latiff et al., 2017). Sharing transparent information enables employees to fully understand the new goal of green practices and align them with their personal interests, leading to better outcomes for the company (Afsar et al., 2018; Puvanasvaran et al., 2009; Tuan, 2016). During this process, servant leaders should also listen to employees' opinions regarding the intention to implement GMP. Listening to employees' ideas does not diminish leaders' capabilities, instead, it will enable leaders to better understand employees' commitment and trust in the organization (Alafeshat & Tanova, 2019; Ng et al., 2016; Puvanasvaran et al., 2009). In other words, servant leaders demonstrate humility by caring and valuing employees, making their work meaningful (Cai et al., 2018; Latiff et al., 2017; Singh et al., 2020). Therefore, this study proposes the following hypothesis:

H_5: Servant leadership significantly mediates the relationship between organizational factors and GMP.

Individual, Servant Leadership, and GMP

In the servant leadership concept, every employee's opinion matters to increase their confidence in effectively implement new changes. Servant leaders must consider employees' perceptions as important to ensuring the implementation of changes that benefit both the company and individuals (Azeyan et al., 2014; Nieves & Quintana, 2016; Shadrick, 2018). Servant leaders should pay attention to employees' passion for ecological awareness, as this fosters empowerment, humility, and courage for employees to embrace and implement new changes such as green manufacturing practices (Dierendonck & Nuijten, 2011; Liden et al., 2014; Riquelme et al., 2019). In fact, it helps reduce employees' intention to leave, as their creative ideas and opinions are encouraged (Brohi et al., 2018; Ortiz-Gómez et al., 2020; Rashid et al., 2017).

Moreover, servant leaders should also pay attention to employees' attitudes towards the environment. Employees' environmental

attitudes can be influenced either by leaders' behaviour or by their own knowledge and skills (Afsar et al., 2018; Luu, 2019; Ozyilmaz & Cicek, 2015; Tuan, 2019). Some employees develop environmental attitudes when they see their leaders demonstrating similar behaviours in implementing new changes, while others already possess these behaviours due to their existing knowledge and skills; these two elements help employees feel aligned with the company's new goals (Afsar et al., 2018; Neubert et al., 2008; Ng et al., 2016). Through attitudes, servant leaders can empower employees to make their own decisions, and any decision made should be appreciated by giving credit for their achievements. This fosters greater employee engagement as their partnership is strengthened (Alafeshat & Tanova, 2019; Cai et al., 2018; Latiff et al., 2017; Luu, 2019). This mediating relationship enables this study to propose the following hypothesis:

H_6: Servant leadership significantly mediates the relationship between individual factors and GMP.

METHODOLOGY

This study selected factory managers working in the manufacturing sector as the unit of analysis because they possess specific knowledge and leadership styles that influence organizational changes (Aljuboori et al., 2022; Hami et al., 2018). A total of 4,484 manufacturing companies were identified through the directory of the Federation of Malaysian Manufacturers (FMM) website and Raosoft, Inc. was used to determine the sample size for studying 354 factory managers representing their respective manufacturing sectors. Stratified random sampling was employed to divide the sample size into sub-groups, known as strata, across all states involved (Aljuboori et al., 2022). For this study, a pilot study was conducted to identify internal consistency or reliability for each variable before the full study commenced (Mukherjee, 2020, Hair et al., 2017, Tsang et al., 2017).

Quantitative methods were used, and a set of questionnaires was developed, with items adopted from previous studies and slightly adapted according to the scope of this study (refer to Appendix A). These items were validated by three panels of experts specializing

in green practices from academic and industry as well as one panel specializing in linguistics (refer to Appendix B). The questionnaire comprised five sections: A for demographics, B for factors influencing GMP, C for mediating relationships, and D for the dependent variable. A five-point Likert-scale was applied in sections B, C, and D.

In the pilot study, 40 respondents, who were factory managers, provided data, which was sufficient to analyse findings of the initial study and assess the effectiveness and quality of the study (Mohd Fuzi et al., 2019; Whitehead et al., 2016). The pilot data was collected over four months. Data collection for this pilot study was collected in three industrial states: Selangor, Johor, and Penang due to higher industrial wastes leading to environmental pollution (Department of Statistics Malaysia, 2021). Additionally, five manufacturing sectors with ISO 14001 certification were involved in this pilot study: food & beverage, fabricated metal, chemical/petroleum, electrical & electronics, and plastics/paper. These sectors were chosen due to their high involvement in environmental issues (Department of Statistics Malaysia, 2020). The collected data were analysed using SPSS version 26, which involved several analyses including Cronbach's Alpha, demographic analysis, mean score calculation, and mediation analysis (Indirect Effects) using PROCESS macro in SPSS version 26 (Hayes, 2012; Sarstedt et al., 2020).

RESULTS AND DISCUSSIONS

In Table 1, demographic data indicates that the respondents are divided into two gender categories: men (65%) and women (35%). This shows that the questionnaire sample received more responses by men than women. Moreover, the majority of respondents involved in this pilot study, have working experience ranging from 5 years up to 10 years (45%) or more than 10 years (30%), while a smaller proportion have less than 5 years (25%) of experience. Additionally, the majority of respondents come from the chemical / petroleum sector (37.5%), followed by plastics / paper (20%), fabricated metals (15%), food and beverages (15%) and electrical and electronics (12.5%). This suggests that the chemical / petroleum sector is more actively involved in green practices.

Table 1

Demographic Data (n=40)

Feature	Dimension	Frequencies	Percentage (%)
Gender	Male	26	65.0
	Female	14	35.0
Working experience	< 5 years	10	25.0
	5 years to 10 years	18	45.0
	>10 years	12	30.0
Industry	Food and beverage	6	15.0
	Fabricated metals	6	15.0
	Chemical/petroleum	15	37.5
	Electrical and electronics	5	12.5
	Plastics/paper	8	20.0
Company's ownership	Local	21	52.5
	Foreign	9	22.5
	Local and foreign	10	25.0
Company's establishment	<5 years	5	12.5
	5 years to 10 years	7	17.5
	>10 years	28	70.0
Target customer	Local	5	12.5
	Regional/Asian	10	25.0
	Global	25	62.5
Number of employees	<100 employees	22	55.0
	100 to 200 employees	4	10.0
	200 to 300 employees	6	15.0
	>300 employees	8	20.0

In the pilot study, it was found that the majority of manufacturing companies consisted of local companies (52.5%) with a smaller portion being a combination of local and foreign (25%). Only a minority of companies had foreign status (22.5%). Most companies

had been established for more than 10 years (70%), followed by 5 to 10 years (17.5%), and less than 5 years (12.5%). This suggests that manufacturing companies in Malaysia have a significant period of establishment in green practices involvement, especially GMP. Additionally, regarding the production of products by manufacturers for global markets, the majority comprised 62.5 percent, compared to regional stages (25%) and local levels (12.5%). Furthermore, companies involved in green practices had a total number of employees of less than 100 (55%), followed by 300 employees and above (20%). Some of these companies had total employees numbering from 100 to 200 people (10%) and 200 to 300 (15%).

In Table 2, all items for each variable involved in this study were found to be reliable as Cronbach's Alpha for each variable exceeded 0.70. For independent variables, the highest Cronbach's Alpha was for individual factors at 0.900, followed by organizational factors (α=0.838) and business environment factors (α=0.748). The mediator for this study, Servant Leadership, showed a Cronbach's Alpha of 0.915 and the dependent variable, GMP, showed 0.916. These results indicate that the reliability of each item is considered acceptable demonstrating positive internal consistency (Castro et al., 2019; Soriano et al., 2020). Thus, there is no need to revise the items unless there is an error that requires all the items to be changed entirely (Perneger et al., 2015). Some researchers also suggest re-evaluating items with Cronbach's alpha values exceeding 0.90 to ensure better responses from respondents (Tsang et al., 2017).

Table 2

Cronbach's Alpha for Variables

Variable	No. of Items	Cronbach's Alpha (α)
Business environment factors	9	0.734
Organisational factors	6	0.861
Individual factors	6	0.916
Servant leadership	21	0.917
Green manufacturing performance	9	0.899

Furthermore, Table 3 shows the preliminary data on factors influencing the implementation of GMP, displaying results based on mean score and standard deviation. Meanwhile, Table 4 presents the analysis of mediating relationships based on indirect effects between variables.

Table 3

Factors Influencing GMP

Factor	Mean Score	Standard Deviation
Business environment:		
• *Competitive edge*	3.81	0.961
• *Law enforcement*	4.45	0.896
• *Technology advancement*	4.08	0.850
Organizational:		
• *Green skilled employees*	3.85	0.826
• *Proactive communication*	4.17	0.664
Individual:		
• *Employee perception*	3.73	0.858
• *Employee attitude*	3.60	0.851

Decision Rule if mean (X) is ≤1.49 very low, 1.5-2.49 is low, 2.5-3.49 is moderate, 3.5-4.49 is high, and 4.5-5 is very high influence (Ikonne & Fajonyomi, 2019)

In Table 3, it is demonstrated that law enforcement has the highest level of mean score of 4.45. This is followed by proactive communication, with a mean score of 4.17, technology advancement M= 4.08, green skilled employees M= 3.85, competitive edge M= 3.81, employee perception M= 3.73, and employee attitude with mean score of 3.60.

In the preliminary results, all factory managers across all five sectors believed that compliance with law enforcement is important because they recognize the importance of protecting the environment. Environmental laws are mandatory to ensure that production activities adhere to the prescribed legal enactments, thereby avoiding potential penalties from the court (Ho et al., 2017; Yacob et al., 2013).

However, this finding contrasts with a previous study conducted by Abdul-Rashid et al. (2017), where environmental law was not deemed significant as a factor in implementing GMP. Many manufacturing companies in Malaysia implemented GMP due to emphasis on environmental and economic aspects, rather than focusing more on social aspects. Despite this, environmental law remains essential to minimize environmental issues in Malaysia's manufacturing industry (Mohd Fuzi et al., 2019).

Face-to-face communication between leaders and employees is crucial for enhancing employees' understanding of GMP, as it facilitates proactive communication through bilateral engagement. The approach fosters a more positive acceptance of green practices among employees because information flow remains consistent (Low et al., 2015; Mendoza-Fong et al., 2018). Additionally, regardless of company ownership, the use of advanced technology as the third important factor can help manufacturing companies reduce production costs and make the production process more environmentally friendly, aligning with findings from a study by Ali et al. (2019).

However, the results of this study differ from previous findings where high-tech utilization did not lead to a reduction in manufacturing costs, even among companies that were ISO 14001 certified. This discrepancy arises because only companies with strong financial resources are able to effectively leverage technological advancements to implement GMP (Ghazali Hassan et al., 2015). In addition, there is a lack of suppliers willing to invest significantly in helping manufacturing companies reduce costs associated with environmentally-friendly production thereby impeding the company's R&D efforts to generate good production. In other words, reducing production costs through technological advances requires substantial investment (Abdul-Rashid et al., 2017; Abdullah et al., 2016).

Although the mean score for factory managers' responses regarding employee attitude across all five sectors was low, it is still considered influential in the implementation of GMP. Employee attitudes hold significance due to employee awareness of the importance of environmental protection, whereby their environmental attitude or behaviour has changed the company's approach to implementing

GMP, not only to achieve personal interests but also to maintain community sensitivity (Afsar et al., 2018; Sultana et al., 2018; Vinojini & Arulrajah, 2017).

Table 4

Indirect Effects of Mediator between Variables

Relationship between variables	Indirect Effects	Boot LLCI	Boot UCLI	Decision
		CI of 95%		
Business environment → servant leadership → green manufacturing practices	0.2141	0.0488	0.5161	Not significant
Organizational → servant leadership → green manufacturing practices	0.4010	0.0679	0.7409	Not significant
Individual → servant leadership → green manufacturing practices	0.4164	0.1411	0.7855	Significant

In Table 4, it is evident that servant leadership did not significantly mediate the relationship between business environmental factors and organizational factors in implementing GMP. Although the indirect effects showed positive results for both factors namely, business environment factors (I.E.=0.2141) and organizational factors (I.E.=0.4010), statistically they were not significant (Table 4, CI of 95%). However, servant leadership was found to have a significant mediating relationship with individual factors in implementing GMP among manufacturers in Malaysia (I.E. = 0.4164, CI of 95% = 0.411, 0.7855).

Based on the results of the mediation analysis, the majority of factory managers considered that servant leadership played a mediating role between individual factors and GMP implementation. They aimed to empower their employees to showcase environmental behaviours that contribute to protecting the environment, such as using recycled materials to minimize waste or turning off lights when not in use to conserve energy. This practice was observed among factory managers in all five sectors except the chemical or petroleum sector, where managers encouraged their employees to be accountable for their

actions and allowed them to express creativity (Latiff et al., 2017; Ying et al., 2020).

However, servant leadership did not mediate the relationship between business environment and organizational factors. This may be attributed to the fact that employees in locally-owned manufacturing companies are given less authority to operate hi-tech equipment, even if they receive proper training or possess certification. Consequently, leaders place less trust in employees' capabilities to manage such equipment effectively, potentially impacting overall employee commitment to the implementation process (Karatepe et al., 2018; Kashyap & Rangnekar, 2016; Wang & Hsieh, 2013). Therefore, it is confirmed that, at the preliminary stage, the level of mediation of servant leadership is only significant for a specific relationship between individual factors and green manufacturing practices, while the mediation relationships with other factors are not significant.

CONCLUSION

Theresults show that all factors positively influence manufacturers' implementation of green manufacturing practices (GMP). Initially, most factory managers attributed GMP implementation to business environment factors, particularly citing strong motivators such as law enforcement and technological advancement. Additionally, factory managers emphasized the importance of organizational factors, particularly proactive communication, in facilitating effective GMP implementation, especially involving two-way communication of the new vision among employees. Although individual factors were considered moderate, the high mean scores for both dimensions suggest a positive influence on encouraging manufacturers to implement GMP effectively.

Despite the reliability of servant leadership in this study, the indirect effects presented showed that the level of mediation of servant leadership was statistically significant only between individual factors and GMP. This suggest that some factory managers prioritize their employees' emotional development rather than thrust them into the entire implementation process. Nevertheless, these results are preliminary findings intended to gauge the initial viewpoints of

factory managers, and more data are needed to complete the analysis. The actual results may differ if all factory managers from each state in Malaysia are included in the study.

In terms of practical ramifications, the results have implications on Malaysian manufacturers in their GMP implementation strategy. The mediation relations further support existing knowledge, indicating that servant leadership can be effectively applied in the manufacturing sector in Malaysia to enhance GMP implementation. This presents a new perspective for manufacturers in Malaysia to uphold global green performance, as this leadership style fosters competitiveness and reduces employee resistance to new changes such as GMP. Thus, both the company's performance and employee engagement in adopting new business practices can be enhanced.

Theoretical contributions of this study stem from the combination of two theories, Beckhard and Harris' Change Equation and RBV, shedding light on implementation strategies, particularly in the context of a developing country such as Malaysia. The synthesis provides useful insights for manufacturing companies in Malaysia seeking to effectively implement GMP. Understanding these key theories explains that successful change implementation depends on stable organizational capacity, particularly in terms of resources, with leadership playing a key role in managing employees as the main asset.

However, several limitations were encountered during the study. Firstly, the time taken to obtain responses from respondents proved lengthy, spanning four months. The delay in the pilot data collection process was exacerbated by reliance on e-mails due to the Covid-19 pandemic. Additionally, initially limited literature on servant leadership and its connection to green practices posed challenges, although subsequent foreign studies have since provided valuable assistance. To address these limitations and enrich future research, several suggestions are proposed. Firstly, conducting mix method studies to obtain more detailed results especially across manufacturing sectors not extensively covered in this study. Secondly, integrating the perspectives of top-level management such as CEOs or board of directors could provide additional depth to the study's findings. Lastly, exploring differences in the implementation of GMP across various developing countries, such as Indonesia, Pakistan and Singapore,

compared to Malaysia, could provide valuable insights for enhancing the manufacturing sector's performance in future green practices.

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APPENDICES

Appendix A: Questionnaire items adopted and adapted from previous studies.

Green Manufacturing Practices

No.	Construct/Item	Source
1	Social	(Habidin et al., 2020; Hami et al., 2016; Malik et al., 2020)
2	Economic	(Hami et al., 2016, 2018; Malik et al., 2020)
3	Environmental	(Aziz et al., 2018; Hami et al., 2016; Ho et al., 2017; Malik et al., 2020)

Business Environment Factors

No.	Construct/Item	Source
1	Competitive edge	(Abdul-Rashid et al., 2017; Ghazilla et al., 2015)
2	Law enforcement	(Abdul-Rashid et al., 2017; Ghazilla et al., 2015; Nordin et al., 2015; Yacob et al., 2013)
3	Technology advancement	(Abdul-Rashid et al., 2017; Ghazilla et al., 2015; Masoumik et al., 2015; Nor Aziati et al., 2016; Ramayah et al., 2013)

Organisational Factors

No.	Construct/Item	Source
1	Green skilled personnel	(Ghazilla et al., 2015; Malik et al., 2020; Nieves & Quintana, 2016; Salisu & Abu Bakar, 2019)
2	Proactive communication	(Ghazilla et al., 2015; Low et al., 2015; Radzi & Othman, 2016; C.-H. Wang, 2019)

Individual Factors

No.	Construct/Item	Source
1	Employee perception	(Alsaad, 2016; Ghazilla et al., 2015; Jia et al., 2018; Malik et al., 2020; Salisu & Abu Bakar, 2019; Vinojini & Arulrajah, 2017; Walker, 2013)
2	Employee attitude	(Luu, 2019; Robertson & Barling, 2013; Tuan, 2019; Vinojini & Arulrajah, 2017)

Servant Leadership

Business Environment Items

No.	Item	Source
1	I prioritize ethical business conduct when competing with other companies in the marketplace.	(Krishnan et al., 2019; Latiff et al., 2017; Opoku et al., 2019)
2	I believe that morality and integrity strengthen our strategic business partnership concerning environmental protection.	(Hernández-Perlines & Araya-Castillo, 2020; Latiff et al., 2017; Malik et al., 2020)
3	I encourage everyone in the workplace to work closely in order to implement GMP effectively.	(Latiff et al., 2017; Malik et al., 2020)
4	I prioritize ethical business conduct in our company's responsibilities.	(Krishnan et al., 2019; Latiff et al., 2017)
5	I urge the company to comply with governmental environmental regulations as part of our culture that upholds human rights.	(Krishnan et al., 2019; Latiff et al., 2017; Malik et al., 2020; Tan, 2005)
6	I urge the company to comply with governmental environmental regulations to emphasize societal responsibility.	(Afsar et al., 2018; Latiff et al., 2017; Opoku et al., 2019)
7	I allow my subordinates to handle hi-tech equipment with minimal supervision.	(Afsar et al., 2018; Krishnan et al., 2019; Latiff et al., 2017; Opoku et al., 2019)
8	I trust my subordinates' abilities to handle hi-tech equipment.	
9	I consider innovative ideas from everyone in the workplace who can enhance our green R&D activities.	(Afsar et al., 2018; Latiff et al., 2017)

Organisational Factors Items

No.	Item	Source
1	I have faith in hiring people with extensive knowledge and skills about GMP.	(Low et al., 2015; Malik et al., 2020; Nieves & Quintana, 2016; Salisu & Abu Bakar, 2019)
2	I consider employees' personal development as priority especially when implementing GMP.	(Gašková, 2020; Latiff et al., 2017; Otero-Neira et al., 2016; Puvanasvaran et al., 2009)
3	I consider training programs conducted for GMP a good investment for everyone in the workplace.	(Malik et al., 2020; Puvanasvaran et al., 2009)

(continued)

No.	Item	Source
4	I will be truthful to my subordinates about the new vision of the company towards GMP.	(Hernández-Perlines & Araya-Castillo, 2020; Ortiz-Gómez et al., 2020; Otero-Neira et al., 2016)
5	I will listen to opinions from my subordinates about the implementation of GMP as part of a new vision.	(Low et al., 2015; Ortiz-Gómez et al., 2020; Salisu & Abu Bakar, 2019)
6	I seek cooperation from my subordinates to implement GMP effectively together.	(Latiff et al., 2017; Low et al., 2015; Puvanasvaran et al., 2009)

Individual Factor Items

No.	Item	Source
1	I see my subordinates' passion for the environment as a priority to implement GMP effectively.	(Dierendonck & Nuijten, 2011; Jia et al., 2018; Neubert et al., 2008;)
2	I support my subordinates' environmental values in implementing GMP.	(Neubert et al., 2008; Ortiz-Gómez et al., 2020; Robertson & Barling, 2013)
3	I consider my subordinates' ideas would help the company achieve environmental goals.	(Malik et al., 2020; Robertson & Barling, 2013; Salisu & Abu Bakar, 2019)
4	I demonstrate environmental-friendly behaviour to my subordinates.	(Afsar et al., 2018; Tuan, 2019; Vinojini & Arulrajah, 2017)
5	I support my subordinates in joining any volunteering programs related to the environment outside the company.	(Robertson & Barling, 2013; Su & Swanson, 2019; Tuan, 2019)
6	I support my subordinates in exhibiting environmental attitudes in the workplace, such as turning off lights when not in use or re-using materials like paper.	(Afsar et al., 2018; Robertson & Barling, 2013; Vinojini & Arulrajah, 2017)