

ORGANISATIONAL AND INDIVIDUAL FACTORS ON THE IMPLEMENTATION OF GREEN MANUFACTURING PRACTICES IN MALAYSIA

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Abstract. International Reports announced that Malaysia's commitment in reducing low carbon emission to overcome environmental problems is inconsistent, where the commitment is considered to be slow or uneven, although various initiatives such as tax exemptions and financial funds are provided by the Malaysian government to manufacturing companies. Empirical studies suggested that the weakness of the company's leadership or the lack of highly skilled workforce in GMP have become one of the key problems. Therefore, this study intends to examine organizational and individual factors in influencing GMP's implementation, as well as evaluating whether servant leadership plays a significant role in GMP implementation as a mediator. The initial results revealed that factory managers indicated organizational factors as the most influential factor in motivating manufacturing companies to implement effective GMP in Malaysia, specifically proactive communication. Meanwhile, individual factors is indicated as the second influential factor in motivating manufacturers implement GMP in Malaysia. In addition, servant leadership mediated the relationship between both factors in implementing effective GMP, providing new knowledge for researchers and other industrial players in Malaysia. Nevertheless, further analysis is required in order to provide more empirical evidences on this research.

Keywords: *green skilled employees, proactive communication, employee perception, employee attitudes, servant leadership*

Introduction

Industrialization has become one of the major causes of global warming, where natural resources are exploited excessively for business purposes, thus threatening the eco-system of the earth due to the increasing greenhouse effects originated from uncontrolled manufacturing activities (Altenburg et al., 2017; Geng et al., 2017; Ramayah et al., 2013). To address the global warming issues, green practices was introduced. Green practice is an approach that offers a variety of benefits to eco-systems such as providing opportunities for companies to carry out eco-friendlier businesses, creating environmental-friendly employment, and improving the health of the people and other living things that exist in the eco-system (Baggia et al., 2019; Ekins et al., 2019; Altenburg et al., 2017). Pressures from certain groups of people such as consumers, regulators, and social groups have driven industrial sector to comply with the green practices in minimizing environmental problems (Baggia et al., 2019; Abdul-Rashid et al., 2017; Ghazilla et al., 2015).

One of the green practices that emerges in overcoming industrialization problems is green manufacturing practices (Ahmad et al., 2019; Ramayah et al., 2013). Many initiatives have been undertaken by corporations to conduct green manufacturing practices in their businesses. For example, hybrid vehicles produced by Toyota adopted the Eco-VAS approach (Toyota Motor Corporation, 2019). The involvement of these multinational corporations inspired other organisations to embark on green

manufacturing practices. Adapting green manufacturing practices into business operations can improve business performance in terms of energy efficiency, water conservation, recycling activities and many more (Yong et al., 2019; Aziz et al., 2018).

In Malaysia, the government has realized the importance of adopting green practices into manufacturing sector, with the purpose of protecting the environment and its sustainability for future generations (Habidin et al., 2015). The urgency of adopting green practices into manufacturing sector also has been discussed in several international meetings such as Asia-Pacific Economic Cooperation (APEC) (Mokhtsim and Salleh, 2014). The enforcement of sustainable development goals (SDGs) also has been reiterated by the United Nations to various countries in overcoming environmental problems (Lanang et al., 2018; Economic Planning Unit, 2017). Thus, it is essential to undertake research areas on green manufacturing practices in the manufacturing sector in Malaysia as part of a proactive strategy in addressing environmental issues.

Problem statement

Malaysia is expecting to increase manufacturing sector's contribution to the economy by 54%, amounting to RM392 billion in 2025. By transforming this sector, the government is able to attract more foreign investment and increase the labour demand in the market as a value-added strategy which can develop a better economic growth (Leong, 2018; Xuxin, 2018). Not only that, green-oriented transformation also can help Malaysia address environmental issues, to improve social well-beings and economy (Ministry of International Trade and Industry, 2018).

Although many green initiatives such as tax exemption and green financial funds have been provided (GreenTech Malaysia, 2020; Chu, 2019), the manufacturing sector still contributes much problems to the environment. Conventional, unhealthy operation activities left massive carbon footprint resulting in pollution (Yong et al., 2019). For example, radioactive disposals in Sungai Kim Kim, Pasir Gudang, Johor has caused major health issues to the local residents (Hammim, 2019). From this situation, it is learnt that green manufacturing practices are not fully implemented by manufacturers in Malaysia. As reported by the Green Future Index 2021 and the Global Economy Index 2018, Malaysia demonstrated a slow and uneven progress in safeguarding environmental sustainability. Malaysia is nowhere near to its neighbouring countries, particularly Singapore in making greatest progress towards achieving low carbon emission in the future.

Empirical studies conducted by Malaysian researchers have proven that the implementation of green manufacturing practices among Malaysian manufacturers are inconsistent, ranging from either moderate or average. They claimed that this inconsistency resulted from the struggles of adopting green manufacturing practices due to either low skilled workforce in green, or weak leadership, leading to moderated acceptance rate (Aziz et al., 2018; Hami et al., 2018; Abdullah et al., 2016). Therefore, there is a need to evaluate the significance of organisational factors and individual factors in the implementation of GMP among Malaysian manufacturers, mediated by servant leadership.

Research objective

The research objectives of this study are specified as; (1) to provide a conceptual framework linking to specified factors that influence the implementation of green

manufacturing practices among manufacturing companies in Malaysia; (2) to determine which factors, namely organisational factors and individual factors are influencing the implementation of green manufacturing practices among manufacturing companies in Malaysia; and (3) to authenticate the mediating role of servant leadership in implementing green manufacturing practices among manufacturing companies in Malaysia.

This conceptual paper firstly, provides review of previous literature essentially discussed the prevailing arguments on the implementation of green manufacturing practices framework. Secondly, this paper discusses the conceptual model designed in providing an all-inclusive framework for future studies and thirdly, addresses a proposition of servant leadership as a mediator in the implementation of green manufacturing practices in Malaysian manufacturing sector.

Literature review

Green manufacturing practices

Green manufacturing practices is an approach used to implement effective environmental-friendly business strategies (Habidin et al., 2015). There are no specific definitions of green manufacturing practices with regards to its specific approaches but it is helpful to overcome environmental problems that existed as a result of industrial activities such as carbon emission or excessive use of water and energy (Ahmad et al., 2019; Yaacob et al., 2018a; Habidin et al., 2015).

Other reasons of implementing green manufacturing practices by manufacturing companies are; manufacturers wanted to control their financial management that involves costings and pricing of products, investment, and more, which are environmental-friendly (Rounaghi, 2019; Mokhtar et al., 2016). In addition, they want to improve their competitiveness level in the global market by improving company's sustainability in terms of social, environmental, and economics (Sultana et al., 2018; Abdul-Rashid et al., 2017; Ghadge et al., 2017). Despite complying with existing environmental laws (Nordin et al., 2015), GMP is implemented to support human rights specifically for consumers and employees to have a better and healthier environment for livelihoods (Mohd Fuzi et al., 2019; Sultana et al., 2018).

Developing research constructs

A. Organisational factors towards green manufacturing practices

Organisational factors are considered either 'human capital' or 'organisational capital' in the implementation of a new business strategy, which are inclusively related to employees' needs in terms of job resources, leadership support, and many more (Sun and Bunchapattanasakda, 2019; Nee, 2011). The two key dimensions of organisational factors are green skilled employees and proactive communication. Having sufficient number of green skilled employees in GMP implementation is vital. Employees who are knowledgeable or skilful in GMP could increase the competitiveness level of the company in the market. The knowledge of exchange involved can sustain the company's position and reputation (Malik et al., 2020; CEDEFOP, 2015). For example, strong green technological capability to create a strong R&D for the company is valued as essential in GMP implementation (Salisu and Abu Bakar, 2019). Having insufficient number of skilled employees in this manner could be an obstacle for the manufacturers

to maintain the implementation process as the labour demand of certified employees with green skills and knowledge is unbalanced (OECD, 2019; Nordin et al., 2015).

Proactive communication between leaders and employees is imperative in dissemination and articulation of green practices as a new vision. Effective communication enables employees to understand the whole intention to implement GMP. Two-way communication should be emphasized proactively in this manner so that new vision can be clearly understood. Not only that, understandable languages also plays a part in effective interactions between leaders and employees (Mendoza-Fong et al., 2018; Mayfield and Mayfield, 2016). Manufacturing managers believed that proactive communication occur when leaders and employees participate in the change process in order to increase the acceptance rate (Nordin et al., 2015), build support and trust in increasing employee commitment towards generating innovative ideas for GMP implementation (Juan et al., 2018; Nor Aziati et al., 2016). Therefore, hypotheses are proposed to identify whether organisational factors significantly influence the implementation of GMP.

H1 (a): Green skilled employees significantly influence the implementation of GMP among manufacturing companies in Malaysia.

H1 (b): Proactive communications significantly influence the implementation of GMP among manufacturing companies in Malaysia.

B. Individual factors towards green manufacturing practices

Individual factors and green practices are inter-related. Employees perceived green practices as a valuable practice to be incorporated into their actions to value the environment (Bansal and Roth, 2000). The two key dimensions of individual factors are employee perception and employee attitudes. Green manufacturing is often implemented by manufacturers because of their employees' reactions towards the environment. This could be observed from employee perception about the process of change involved in the practice (Izuchukwu et al., 2014). When employees perceived GMP as a positive approach, that means they are ready for the change (Altaf et al., 2019; Izuchukwu et al., 2014) because they assumed that this practice is a great investment to improve company's long-term performance and generate more innovative ideas and knowledge to safeguard their commitment towards GMP (Yacob et al., 2018b; Low et al., 2015).

Empirical evidence reported that, when employees are given opportunity to share their passion on green practices, more innovative ideas and knowledge can be generated and more structured plans can be developed to minimize environmental problems (Jia et al., 2018; Liphadzi and Vermaak, 2015). Positive motivations are required to help employees to be more creative in generating thoughtful ideas and secure their commitment towards new workloads (Jia et al., 2018; Low et al., 2015). Employees' perceptions should not be limited to certain employee position level; it must involve all employees in ensuring a successful GMP implementation. If employee perceptions are capped, then it could indicate negligence (Hami et al., 2018; Liphadzi and Vermaak, 2015).

Attitude means judgement, either positive or negative towards the new change (Elias, 2009). Employee attitudes can be stimulated by organisational culture, size, management style or technology; in other words, it can be influenced by situational factors (Čudanov et al., 2019; Lanang et al., 2018). Employees who are aware of the

emergence of green practices will be exhibiting environmental behaviours and committed to perform their duties appropriately. They also consider environmental concerns when making decisions (Vinojini and Arulrajah, 2017; Zibarras and Coan, 2015; Blok et al., 2014). When their environmental abilities are acknowledged, they surely feel connected and are ready to participate in GMP implantation because they can share their eco-knowledge and skills among others (Salisu and Abu Bakar, 2019; Zibarras and Coan, 2015). Furthermore, training programs could enhance employees' environmental attitudes or behaviour. When this happens, green trust and identity are developed in the workplace, facilitating an efficient GMP implementation (Malik et al., 2020; Luu, 2019a; Su and Swanson, 2019). Therefore, hypotheses for this factor are proposed as follows;

H3 (a): Employee perceptions significantly influence the implementation of GMP among manufacturing companies in Malaysia.

H4 (b): Employee attitudes significantly influence the implementation of GMP among manufacturing companies in Malaysia.

C. Servant leadership as a mediator to implement green manufacturing practices

Servant leadership is a leadership style that was introduced by Robert K. Greenleaf to prioritise the followers' interests over the will of the leaders in the management (Ingram, 2016). This study adopts six important characteristics of servant leadership, which were identified to influence a better change implementation, namely humility, authenticity, empowerment, stewardship, accountability, and courage (Latiff et al., 2017). Practically, this leadership style is meant for Christianity (Gandolfi and Stone, 2018) but it was expanded to other religions' practicality such as Islam (Jabarkhail, 2020). Studies found that a servant leader should be humble and self-assured to acquire help from employees, ensuring the implementation of new change runs smoothly. This ideas improve their relationships and create more positivity in the workplace (Singh et al., 2020).

Under organisational factors, servant leaders should be more ethical when providing information about specific jobs acquired to implement GMP to potential employees in order to avoid sabotage upon employment (Tuan, 2019; Afsar et al., 2018). This suggests that integrity and morality are important in implementing a new change such as green manufacturing practices (Thao and Kang, 2020; Halawi and Zaraket, 2018; Latiff et al., 2017). Not only that, servant leaders also are creating a community of servant leadership-based employees who exhibit higher sense of responsibilities and resilience at workplace in their own ways (Opoku et al., 2019; Haar et al., 2017; Chiniara and Bentein, 2016).

When new vision of green is disseminated to the whole organisation, servant leaders are highly encouraged to acknowledge employees' opinions to understand employees' needs and ideas in GMP implementation. Servant leadership qualities are believed to serve as an enabler in communicating effective information flows for increased understanding of the new change among employees (Mendoza-Fong et al., 2018; Latiff et al., 2017). Besides, servant leaders exhibit humility by understanding employees' emotions thus influence them to value their work meaningfully (Cai et al., 2018). It is concluded that servant leadership is effective in GMP implementation especially when acquiring highly skilled employees in green practices and conveying new information.

A servant leader considers every opinion of employees as important and this can enhance employee self-confidence to participate in GMP change implementation. Paying attention to employees' passion on ecological awareness will make companies be more sensitive on environmental conservation (Luu, 2019b; Tanno and Banner, 2018; Ozyilmaz and Cicek, 2015;). Employees' perceptions also are influenced by servant leaders' behaviours because leaders' environmental behaviours somehow can empower employees to participate in the change positively and change their perception on protecting the environment despite increased workload (Afsar et al., 2018; Rashid et al., 2019).

Lastly, positive attitudes often exist when employees or leaders exhibit pro-environmental behaviours, as their knowledge and skills can optimize the implementation of green manufacturing practices in the organisation. Studies propounded that if servant leaders behave positively, employees will do the same in performing their new duties (Afsar et al., 2018; Azeyan et al., 2014). Again, this indicates that environmental behaviours of servant leaders also influence the attitude or behaviours of employees in the organisation. Furthermore, when employees are appreciated for their achievements in performing new tasks, positive attitude among employees will increase and their psychological needs will also be fulfilled. This shows that servant leaders empower their employees who are courageous in decision making by giving credits on their achievements (Alafeshat and Tanova, 2019; Karatepe et al., 2018; Ozyilmaz and Cicek, 2015). This study identified four important characteristics of servant leaders which mediate the relationship between four independent variables (green skilled employees, proactive communication, employee perception, employee attitudes) and GMP implementation among manufacturing companies in Malaysia. The four characteristics of a servant leader are; empowerment, humility, courage, authenticity. Therefore, hypotheses for these mediating relationships are proposed as follow;

H5 (a): Servant leadership positively mediates the relationship between green skilled employees and GMP among manufacturing companies in Malaysia.

H6 (b): Servant leadership positively mediates the relationship between proactive communication and GMP among manufacturing companies in Malaysia.

H7 (c): Servant leadership positively mediates the relationship between employee perception and GMP among manufacturing companies in Malaysia.

H8 (d): Servant leadership positively mediates the relationship between employee attitudes and GMP among manufacturing companies in Malaysia.

Recommended conceptual framework

The previous section discusses that the empirical outcomes of organisational and individual factors were consistent in influencing the implementation of GMP in Malaysia. The study of servant leadership as a mediator to influence the implementation of GMP is vital as this leadership encourages employees to be ethically professional in every aspect of organisational change, particularly in green manufacturing practices implementation. Therefore, this study recommends a conceptual framework for future studies as illustrated in *Figure 1* below.

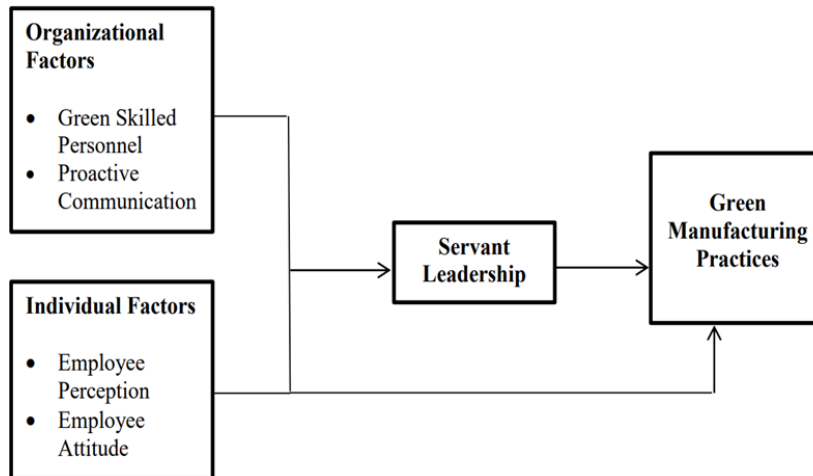


Figure 1. Conceptual framework of the study.

Materials and Methods

A quantitative analysis is used to provide answers for the hypotheses of the study. A set of questionnaire is developed for data collection and distributed to manufacturing managers. The questionnaire design measures managers' agreements or disagreements on statements pertaining organisational factors and individual factors using the Likert scale of five points, ranging from 1 (Strongly disagree) to 5 (Strongly Agree).

For servant leadership, the similar Likert scale is used with different statement of agreements or disagreements, ranging from 1 (Never) to 5 (Always). The questionnaire items are adopted from established questionnaire of previous studies with little modification. Manufacturers who are accredited with ISO 14001 are identified as sample population, where factory managers are recruited for the initial stage of the survey. Five manufacturing sectors will be involved in this study, namely chemical/petroleum, food and beverages, electrical and electronics, plastics/papers, and fabricated metals due to their high contribution to the environmental problems (Ghazali Hassan et al., 2015). By using a multistage clustering sampling, three industrial states are chosen, namely Selangor, Johor, and Penang. The data will be analysed by using SPSS version 26 (Aziz et al., 2018; Olusegun et al., 2014).

Results and Discussion

The initial data of the study obtained from 30 factory managers indicated positive results. The initial data for organizational and individual factors that influence the implementation of green manufacturing practices (GMP) among manufacturing companies in Malaysia can be viewed in *Table 1* and the mediating relationship results of servant leadership in implementing green manufacturing practices is tabulated in *Table 2*.

Table 1. Organizational and individual factors results.

Dimension		Scale (in percentage)					
		SA	A	NAD	D	SD	MS
Organizational factors	Green skill personnel	13.3	56.7	23.3	6.7	-	3.9

	Proactive communication	26.7	56.7	16.7	-	-	4.18
Individual factors	Employees perception	13.3	43.3	36.7	6.7	-	3.74
	Employee attitude	16.7	40	40	3.3	-	3.69

Notes: SA=Strongly Agree; Agree=; NAD=Neither Agree/Disagree; D=Disagree; SD=Strongly Disagree; MS= Mean Score; Decision rules of mean score: ≤ 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 (Ikonne and Fajonyomi, 2019).

Table 2. Mediating relationship of servant leadership results.

Relationship	MS	SD
Servant leadership-green skill personal-GMP	3.99	.685
Servant leadership-proactive communication-GMP	4.33	.582
Servant leadership-employee perception-GMP	4.15	.677
Servant leadership-employee attitude-GMP	4.39	.605

Notes: MS= Mean Score; SD=Standard Deviation; Decision rules of mean score: ≤ 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 (Ikonne and Fajonyomi, 2019).

The initial results of the study in *Table 1* revealed that all items for both factors exceed the mean Score of 3.5, which is beyond moderate level of influence. The organizational factor demonstrates high influence in motivating manufacturing companies to implement GMP with the mean score of 4.04 as a whole. More than 50 per cent of the factory managers agreed that proactive communication is a key factor in organizations that influences manufacturing companies in GMP implementation with the mean score of 4.18, followed by green skilled personnel with the mean score of 3.90. These results are in line with results from a previous study by Low et al (2015), where communication between senior managers and employees is essential in safeguarding employee motivation and participation throughout GMP implementation process. Additionally, acquiring skilled and knowledgeable employees in green manufacturing practices are greatly deemed as a value-added criterion to manufacturing companies in maintaining competitive performance for longer periods due to high commitment and expertise (Barzegar et al., 2018; Malik et al., 2020).

Meanwhile, more than 40 per cent of factory managers opined that individual factors also play an important role in influencing their company in implementing GMP with employee perceptions as a major factor with the mean score of 3.74, followed by employee attitude or behavior towards green practice with the mean score of 3.69. Overall, individual factors are indicated as the second most important factor in influencing the manufacturing company in GMP implementation with an overall mean score of 3.72 after organizational factors. Being opinionated employees about green practices can motivate manufacturing companies implement GMP more effectively as it also indicates that the top management genuinely cares about their commitment and career development (Hami et al., 2018; Low et al., 2015; Nor Aziati et al., 2016). Not only that, it showed the concerns about employees' attitudes towards green practices can also maximize pro-environmental behaviours within an organization (Afsar et al., 2018).

Furthermore, *Table 2* shows the initial results of the study on the mediating relationship of servant leadership in helping manufacturing companies implement GMP. Overall mean score shows that the servant leadership has a strong mediating relationship with the individual factor in the implementation of GMP with the mean score of 4.27. Mediating relationship between employee attitudes and servant leadership greatly influenced the implementation of effective GMP with the mean score of 4.39. However, the mediating relationship between proactive communication and servant leadership is indicated as the second mediating relationship that influenced the implementation of GMP with the mean score of 4.33. Therefore, Servant Leadership can be considered influential in assisting manufacturing companies to implement GMP effectively through mediating relationships between both factors. Previous studies indicated that servant leadership has a significant influence in empowering employees to be more creative with ideas and enhancing their knowledge and skills as well as empowering them to be a good decision maker especially in green practices (Hernández-Perlines and Araya-Castillo, 2020; Tuan, 2019).

Conclusion

Our initial findings are considered encouraging and convincing because all the hypotheses are positive. In addition, all the objectives of the study, specifically objective 2 and objective 3 are achieved. Organizational factors, specifically proactive communication has become a key factor in motivating manufacturing companies in Malaysia to implement GMP effectively, followed by acquiring highly skilled employees in green practices. Meanwhile, individual factors are indicated as the second influential factors in motivating manufacturing companies to implement GMP effectively. Although green manufacturing received attention from manufacturers in Malaysia, there is an urgency to consider certain factors such as hiring certified and talented employees with green knowledge and skills as well as empowering more employee involvement to implement GMP. Furthermore, effective leadership should be prioritized as a measure to enhance the effectiveness of GMP implementation among manufacturing companies in Malaysia. Current literature review propounded that effective leadership determines the articulation and implementation of a new vision such as green vision as well as empowering employee participation in the implementation of GMP (Low et al., 2015; Malik et al., 2020; Nor Aziati et al., 2016). Servant leadership has been identified as an effective leadership style for such change implementation (Haar et al., 2017; Tuan, 2019).

Below are recommendations provided to enhance the implementation of green manufacturing practices (GMP), specifically through organizational factors and individual factors in Malaysia;

- (a) In order to enhance employees' understanding towards GMP, more information should be provided such as the benefits of being certified with ISO 14001: environmental management system throughout the organization. For effective information dissemination, communication channels such as digital communication tools can be used to enhance employees' understanding and to enable them to be updated with new information. This could help managers develop a proper communication structure to support an effective implementation

of GMP (Biloslavo and Trnavcevic, 2009; Ghazilla et al., 2015; Mendoza-Fong et al., 2018);

- (b) Periodical training programs should be provided in order to improve employees' knowledge and skills on green practices. This kind of training not only improves the existing employees but potential employees who are already equipped with knowledge on green practices. Not only that, employees who are certified and talented with green knowledge and skills should be encouraged to conduct training programs for existing employees so that green knowledge and skills are well-shared. Incentives should also be provided for employees who conduct trainings in encouraging them to deliver trainings; thus improving innovative ideas among employees as well as saving money from hiring external trainers for such programs. With this recommendation, managers are able to enhance employees' capabilities to sustain company's performance (Malik et al., 2020; Salisu and Abu Bakar, 2019).

All of these recommendations are believed to enhance the company's performance in green practices with leadership as the main driver. Managers should apply servant leadership concept in making a great impact on the implementation of GMP because servant leadership prioritizes employees' needs above leaders' needs. When employees are filled with good and positive encouragement from their leaders, employee contribution in GMP implementation is likely to increase. This is because leaders who pay attention to employees' career development will not only benefit the employees in the future but the company as well (Hami et al., 2018).

Even though the findings are assumed to be convincing, this paper presented only initial findings on factors influencing the implementation of GMP, mediated by servant leadership among manufacturing companies in Malaysia. Further analysis will be carried out to provide solid evidences on this matter. We believed that some insightful thoughts from the factory managers are able to provide better verification on this topic and are useful for upcoming studies by giving different perspectives or implications.

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Conflict of interest

The authors would like to declare that there is no potential conflict of interest with respect to authorship and/or publication of this paper.

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