Antecedents of organizational citizenship behavior towards the environment in manufacturing organizations: using a structural equation modeling approach

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Abstract

Purpose – Organizations worldwide are integrating sustainability into their operations to reduce the damage they do to the environment and to earn a better reputation in society. Scholars have acknowledged the role of environmental transformational leadership (ETL) in creating pro-environmental behaviors (PEBs). The manufacturing sector has shown interest in accepting an environmental management system (EMS) and fostering a mechanism for what is called perceived support organizational support for the environment (POSE). Voluntary PEBs taking the form of organizational citizenship behavior toward the environment (OCBE) increasingly interests researchers because it is important for the success of the EMS in the manufacturing sector. This study aims to investigate the mediating role of the EMS and POSE in the relationship between ETL and OCBE within ISO14001-certified Malaysian manufacturing firms.

Design/methodology/approach – A quantitative design was used based on a positivist approach. The data of 216 manufacturing firms were targeted using random probability sampling via a survey questionnaire. Later, the data were analyzed through the structural equation modeling (SEM) method using the SmartPLS 3.3.3 software.

Findings – Research findings confirmed a significant direct positive relationship between ETL and OCBE. Also, they confirmed the mediating role of the EMS and POSE in the relationship between ETL and OCBE among ISO14001-certified Malaysian manufacturing firms.

Research limitations/implications – This research has vital ramifications for both managers and organizations. Manufacturing firms should modify the traditional OCB towards pro-environmental OCBE using key antecedents, e.g. ETL, EMS and POSE.

Conflicts of interest: The authors declare no conflict of interest.

1. Introduction

The future of the world is at stake as Earth's environment continues to suffer from the harmful consequences of business activities (Khan *et al.*, 2020; Tosti-Kharas *et al.*, 2017). The concern for future generations has made society cautious about the issues related to the environment, climate change and global warming (Pacana and Ulewicz, 2017). Scientists have maintained that if human existence is to be sustained on this planet, then societies will need to adapt accordingly (Oliveira *et al.*, 2016). Therefore, various stakeholders build pressure and expect organizations to minimize the damage done to the environment (Podgorodnichenko *et al.*, 2020). As such, businesses are moving away from harming the environment and voluntarily embracing environmental management systems (EMS) (Kim and Park, 2017; Salim *et al.*, 2018; Khan *et al.*, 2021). EMS such as ISO14001 allows firms to strike the right balance between their goal of making profits, paying dividends to shareholders and also recognizing their ethical responsibilities to be sustainable and environmentally friendly for the sake of future generations (Feng and Wang, 2016; Jiang *et al.*, 2020; Seifert and Guenther, 2020; Voinea *et al.*, 2020). Over time, the managers of such firms have realized that implementing EMS can be successful if employees are involved in a meaningful way (Ansari *et al.*, 2020; Yuriev *et al.*, 2018).

An employee demonstrates his or her involvement in such sustainability-oriented systems by engaging in voluntary PEBs such as organizational citizenship behavior toward the environment (OCBE) (Boiral *et al.*, 2015; Boiral and Paillé, 2012). However, very few studies have focused on OCBE or its antecedents (Cheema *et al.*, 2020; Testa *et al.*, 2018). It is, therefore, essential to building on the knowledge we have about what leads to OCBE by employees (Mi *et al.*, 2019). Another critical factor is perceived organizational support for the environment (POSE), which can be defined as organizational support lent to the employees to conduct "green" practices. Cantor *et al.* (2012) revealed that POSE signals employees to be sustainable in business operations. Lamm *et al.* (2015) argued that the signaling being conveyed to workers about the importance of the environment must be backed up by policies and resources to make this practical. Sustainability literature has highlighted the role of leadership in motivating employees for OCBE (Ying *et al.*, 2020).

The construct of ETL is an essential predictor of OCBE (Li *et al.*, 2020). However, as several scholars have stated (Kim *et al.*, 2020; Robertson and Barling, 2015a, b), research specifying the relationship between ETL and OCBE is limited to date. Moreover, a lot remains unsaid in the extant literature about the underlying mediating mechanism between ETL and OCBE (Kim *et al.*, 2020). Therefore, this study contributes to the body of knowledge and investigates the relationship between ETL and OCBE, through a mediating mechanism using theoretical perspectives of the social exchange theory (SET) (Blau, 1964; Homans, 1974) and an ability-motivation-opportunity paradigm (Appelbaum *et al.*, 2000). Then the proposed research model is explained. Investigated here is the mediating role of EMS and POSE in the relationship between ETL and OCBE in ISO14001-certified Malaysian manufacturing firms.

2. The theoretical background

The current study's model consisted of four primary constructs: (1) ETL exogenous variable, (2) POSE, (3) the EMS as the mediating variable and (4) OCBE as an endogenous variable.

This study is based on the social exchange theory (Blau, 1964; Cropanzano *et al.*, 2017) and the ability-motivation-theory (Appelbaum *et al.*, 2000) to underpin the arguments made here (see Figure 1).

2.1 Literature review on organizational citizenship behavior toward the environment (OCBE)

OCBE are discretionary pro-environmental ones. Scholars have noted that these behaviors are voluntary in nature (Boiral and Paillé, 2012). Individuals in the workplace perform these behaviors to improve the environment (Pham *et al.*, 2019). The concept of OCBE emerged from the concept of organizational citizenship behaviors (Boiral *et al.*, 2015). The difference between these two concepts is that when employees enact organizational citizenship behavior (OCB), they have an organization's interests at heart (Boiral *et al.*, 2015; Paillé Boiral, 2013). However, when employees perform OCBE, they have an interest in the environment (Paillé Boiral, 2013). Although several definitions appeared in the extant literature (Mesmer-Magnus *et al.*, 2012; Ones and Dilchert, 2012; Ramus and Steger, 2000), this study adopted the definition of Boiral (2009) according to whom OCBE can be understood as "individual and discretionary social behaviors not explicitly recognized by the formal reward system and contributing to improve the effectiveness of environmental management of organizations" (p. 223). OCBE incorporates three dimensions (Boiral and Paillé (2012): eco-helping, eco-initiatives and eco-civic-engagement. Eco-helping is about colleagues in terms of the environment. Eco-civic engagement occurs when an employee willingly becomes a participant in environment-focused events held in the organization. The third dimension of OCBE is eco-initiatives, which involves employees proactively taking charge of environment-related initiatives and taking practical steps to help the environment (Boiral and Paillé, 2012).

2.2 Environmental transformational leadership (ETL)

The concept of ETL is based on the transformational leadership style (Robertson and Barling, 2015a). In the literature on this style, there is a tradition of facet-specific research (Barling *et al.*, 2002), and it adopted the facet-specific lens for refining the characteristics of transformational leadership in the context of safety, parenting and education (Barling *et al.*, 2002;
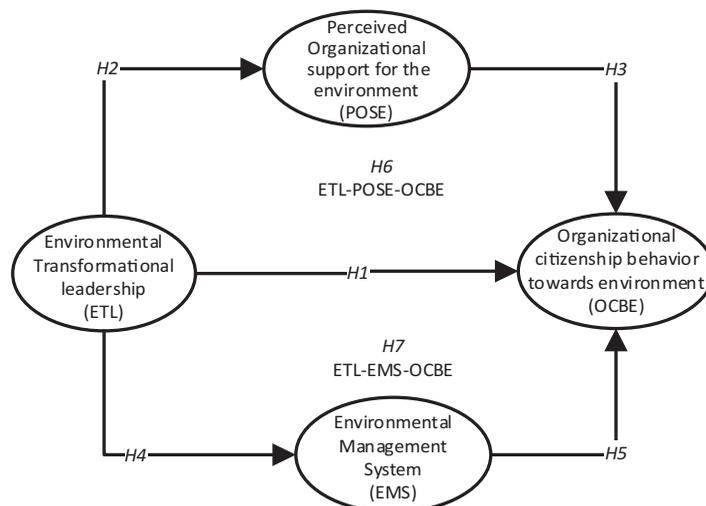

Figure 1.
A conceptual model

Morton *et al.*, 2011; Robertson and Barling, 2017a, b). ETL style emerged from this tradition of research (Chen and Chang, 2013; Robertson and Barling, 2013). As stated by Chen and Chang (2013), ETL is defined as follows: "behaviors of leaders who motivate followers to achieve environmental goals and inspire followers to perform beyond expected levels of environmental performance" (p. 109). ETL is known to have four dimensions (Chen and Chang, 2013). Idealized influence functions when a leader is the role model for employees when dealing with the environment (Robertson and Carleton, 2018). When a leader motivates followers to take care of the environment, what is required here is the dimension of inspirational motivation (Chen and Chang, 2013; Robertson and Barling, 2013). The dimension of intellectual stimulation is about the leader being encouraging to the employees to care for the environment (Chen and Chang, 2013; Robertson and Barling, 2013). The fourth dimension–individualized consideration–deals with the leader's behavior in terms of the relationship with employees with reference to the environment. This dimension involves coaching and mentorship (Chen and Chang, 2013; Robertson and Barling, 2013).

2.3 The environmental management system (EMS)

Scholars' interest in an EMS is a part of a larger societal shift to finding solutions to the damaged environment, climate change and global warming (Feng and Wang, 2016). Environmentally responsible organizations implement management systems to balance their business and sustainability functions (Fuzi *et al.*, 2019). The present study operationalizes the EMS according to Florida and Davison (2001): "a formal system of articulating goals, making choices, gathering information, measuring progress, and improving performance" concerning resource use, throughput and emissions (p. 64). A report entitled "Our Common Future" by WCED (Hurlem, 1987; Imperatives, 1987) is a notable document drawing the attention of the global community to the importance of environment and climate change. The report documented novel insights regarding the implementation of environmental management and the requisite decision support systems.

Another milestone was achieved when in 1992, as a result of joint efforts of the "International Organization for Standardization" (ISO) and "International Electrotechnical Commission" (IEC), an Earth Summit was held in Rio de Janeiro (ISO, 2015). The summit aimed to synthesize environmental standards for practical implementation. This summit led to both ISO and IEC setting up a committee dedicated to reviewing and supervising the criteria and standards of EMS (Bansal and Bogner, 2002). While EMS ISO14001 emerged for the first time in 1996, it underwent refinements in 2000 and 2004. For instance, EMS ISO14001 has been acknowledged globally in contributing to better economic, social, organizational and environmental performance (Ikram *et al.*, 2019). Moreover, EMS guidelines for the manufacturing industry have been entirely instrumental. Scholars (Fuzi *et al.*, 2019) have argued in favor of Malaysian manufacturing firms adopting EMS so that their personnel can enact PEBs. EMS is a framework comprising specific parameters that the compliant firms voluntarily adopt. It enables them to improve both financial and environmental performance (Bravi *et al.*, 2020).

2.4 Perceived organizational support for the environment (POSE)

Scholars conceptualized POSE. At first, Ramus and Steger (2000) argued that POSE could be viewed as a strategy made available to employees such as green human resource management practices. Cantor *et al.* (2012) expanded this view by conceptualizing it as signaling employees to be mindful of the environment and being sustainable in terms of their work practices. However, Lamm *et al.* (2015) expanded the concept of POSE by arguing that it is not only the signaling being conveyed to the employees that is important but also ensuring the provision of required policies, procedures and resources. Accordingly, we operationalize

POSE in accordance with the conceptualization made by Lamm *et al.* (2015): "the specific beliefs held by employees concerning how much the organization values their contributions toward sustainability" (p. 209).

2.5 Hypotheses development

There are several factors determining the behaviors of employees (Biswas and Varma, 2012). The leaders of a company are considered the primary influences on the behaviors, affective reactions, beliefs, well-being and performance of their employees (Den Hartog and Belschak, 2012 and Chen *et al.*, 2014a, b) and extra-role performance (Ahmad *et al.*, 2019). In the extant literature, various leadership styles have been devised and investigated (Nanjundeswaraswamy and Swamy, 2014). Scholars have shown interest in the consequences of leadership styles for employees' behaviors (Dulewicz and Higgs, 2005). In the environment-related literature, scholars have explored different leadership styles such as servant leadership (Tuan, 2018), responsible leadership (Han *et al.*, 2019) and transformational leadership (Kim *et al.*, 2019; Kura, 2016). Scholars have linked the aforesaid green-leadership styles and green outcomes at the employee level, such as green product development (Chen and Chang, 2013), green creativity (Mittal and Dhar, 2016) and PEBs (Kim *et al.*, 2019; Robertson and Barling, 2013). For instance, voluntary PEBs like OCBE remain an area of special interest for scholars because they are critical to the sustainable performance of manufacturing firms (Chang *et al.*, 2019).

Research has accumulated evidence that environmental transformational leadership enables employees to perform OCBE (Kim *et al.*, 2019; Robertson and Barling, 2017a, b; Robertson and Carleton, 2018). Environmental transformational leaders are role models with respect to pro-environmental behaviors (Chen and Chang, 2013). They encourage their employees to be creative and innovative when dealing with such matters (Chen and Chang, 2013) and function as facilitative bosses who provide policies, procedures and resources to make PEBs meaningful (Mittal and Dhar, 2016; Singh *et al.*, 2020). A conducive atmosphere allows employees to comprehend the importance of the environment and sustainability (Anwar *et al.*, 2020). Environmental transformational leaders adopt behaviors that enable workers to conduct OCBE (Robertson and Carleton, 2018). Employees cannot be forced to enact voluntary PEBs, for example, OCBE (Wang *et al.*, 2018).

These behaviors are only implemented by employees when they are internally motivated to do so (Konovsky and Pugh, 1994; Organ *et al.*, 2005). Their free will is necessary given that these behaviors are not explicitly stated in the company's official job descriptions (Lamm *et al.*, 2013). Robertson and Carleton (2018) examined the relationship between environmental transformational leadership and organizational citizenship behaviors. Their study revealed that environmental transformational influences the organizational citizenship behaviors through the mediating construct of co-workers' pro-environmental attitude, assuming that it actually exists. Elsewhere, Kim *et al.* (2019) conducted an empirical study and found that managers' environmental transformational leadership affects organizational citizenship behavior. These scholars found that environmental belief mediated the aforementioned relationship. Thus, we hypothesize the following observations:

H1. Environmental transformational leadership has a positive relationship with organizational citizenship behavior to the environment.

2.6 Environmental transformational leadership and perceived organizational support for the environment

Organizations are non-living entities that only "live" in terms of the people who work in them (Eisenberger *et al.*, 1986). Businesses hire agents to deal with employees on the organization's

behalf (Rhoades and Eisenberger, 2002), and such agents can include managers, supervisors, leaders, units, departments, co-workers, etc. (Eisenberger *et al.*, 2002). Scholars have argued that leaders personify their organizations because of their power, status and ability to provide resources (Raineri and Paillé, 2016; Eisenberger *et al.*, 2002, 2020). Levinson (1965) argued that employees tend to generalize the behaviors of leaders, and workers function in such a way as if it were the organization's behavior. With that being said, we posit that employees might assume that the environmental transformational leader embodies a green organization, and the transformational leader provides resources that are socio-emotional in nature. Considering the logic of a leader's personification of the organization (Levinson, 1965), it can be reasoned that the resources they deliver shape the perceptions of employees about the environment (hereafter referred to as POSE). POSE is a generalized belief about the extent to which the contribution made by them with regards to sustainability is valued by the organization through appreciation and incentives (Lamm *et al.*, 2015).

An environmental transformational leader provides psychological support to employees to innovatively deal with "green" matters (Kim *et al.*, 2019; Robertson and Barling, 2013), and we conjecture that employees will view this autonomy as a supportive mechanism. Moreover, the behavioral template offered by an environmental transformational leader will also be seen by the staff as a resource to reduce uncertainty and bring about clarity related to green issues (Robertson, 2018). The gestures of an environmental transformational leader for employees to exceed the requirements of the job in connection with environmental matters will also be construed as POSE (Graves and Sarkis, 2018). More importantly, the individualized consideration that is one of the hallmarks of an environmental transformational leader will be considered a form of organizational support for the environment (Kim *et al.*, 2019; Robertson and Barling, 2013; Robertson and Barling, 2017a, b). Having such a relationship with employees entails a leader being mindful of the needs, questions and support requirements for employees when dealing with environmental matters (Chen and Chang, 2013). In our view, the supportive behavior shown by the environmental transformational leader means that workers feel they are validated by their employer.

Relatedly, previous empirical evidence has found a positive relationship between the construct of transformational leadership and perceived organizational support. Recently, meta-analytic evidence detected a significant positive relationship between transformational leadership style and perceived organizational support (Kurtessis *et al.*, 2017). A study based on the time-lagged data collected from diverse industries operating in China by Yizhong *et al.* (2019) found evidence for a positive relationship between transformational style of leadership and perceived organizational support. Empirical evidence reported by Yildirim and Naktiyok (2017) indicates a positive relationship between the two constructs. Elsewhere, Weiherl and Masal (2016) reveal that the two constructs have a positive relationship. Drawing on a sample of 287 employees employed in a water production organization, Stinglhamber *et al.* (2015) found evidence of the positive relationship between the transformational leadership and perceived organizational support. Similarly, other leadership styles such as servant leadership (Zhou and Miao, 2014), ethical leadership (Tan *et al.*, 2019) and inclusive leadership (Qi *et al.*, 2019) emerged as being positively related to perceived organizational support. In the sustainability literature, supervisor supportive behavior is a predictor of perceived organizational support for the environment (Cantor *et al.*, 2012).

Based on the studies cited above, we contend that the support extended to the environment inherent in the actions of environmental transformational leaders will enhance perceived employees' support for environmental activities. Thus, we hypothesize the following obserevations:

H2. Environmental transformational leadership will be positively related to perceived organizational support for the environment.

2.7 Perceived organizational support for the environment and organizational citizenship behavior toward the environment

People in an organization navigate the social life that prevails in it by following the norm of reciprocity (Blau, 1964; Cropanzano et al., 2017). The norm of reciprocity is governed by the social exchange principle, which is characterized by "quid pro quo" (Homans, 1961, 1974). That is, employees will feel themselves to be under the moral obligation to reciprocate favors conferred upon them by people in the organization (Cropanzano and Mitchell, 2005; Konovsky and Pugh, 1994 and Zoller and Muldoon, 2019). A sense of reciprocity is instilled through providing resources that are either tangible or intangible such as socio-emotional that make it possible for tasks to be done (Eisenberger et al., 2001; Rhoades et al., 2001; Rhoades and Eisenberger, 2002). The provision of such resources enables the employees to feel supported by their employers (Eisenberger et al., 2020). These resources could include appreciation and guidance, among others. From the perspective of environmental psychology and sustainability, organizations that ensure the availability of socio-economic resources will successfully build the perceptions of employees that their efforts regarding environmental matters are being taken seriously (Lamm et al., 2015; Paillé Valéau, 2020).

Grounding our arguments in the theory of social exchange (Blau, 1964; Homans, 1961) and the norm of reciprocity (Gouldner, 1960), we assert that employees who experience a higher level of perceived organizational support for the environment will be highly likely to reciprocate in kind. In complying with the social norm of reciprocity, they will transcend the job-task requirements specified in their official job description (Paillé Meija-Morelos, 2019; Pham et al., 2018). They will not hold themselves back from going the extra mile for the environment (Graves and Sarkis, 2018). Prior studies have found that employees who receive the appropriate resources tend to enhance their extra-role behaviors (Kurtessis et al., 2017; Ng, 2017). To pay back their firms for POSE, employees can demonstrate organizational citizenship behaviors that favor the environment (OCBE). As POSE is exclusively focused on sustainability and the environment (Lamm et al., 2015; Montabon et al., 2016), we contend that staff members will reciprocate through OCBE.

Aside from the theoretical rationale, we propose that there is a relationship between perceived organizational support for the environment, organizational citizenship behavior and the environment, based on the empirical findings in the literature. Numerous studies have found that perceived organizational support is reciprocated by employees through their organizational citizenship behaviors. Recently, Thompson et al. (2020) gathered evidence for the relationship between perceived organizational support (POS) and OCB. Several studies showed that they do have a positive relationship (Chen et al., 2005; Chiang and Hsieh, 2012; Demir, 2015; Afsar and Badir, 2016; Eva et al., 2020; Gaudet and Tremblay, 2017; Moorman et al., 1998; Pohl et al., 2019; Tan et al., 2019; Thompson et al., 2020; Valeau and Paillé, 2019; Zhong et al., 2016). In research on sustainability, some studies tackled the relationship. For example, a survey study conducted in the Netherlands by Wesselink et al. (2017) reported a positive relationship between POSE and PEBs. Recently, POSE and employee eco-initiatives were positively related (Bhatnagar and Aggarwal, 2020). Interestingly, perceived organizational support, in general, has been observed to be predicting OCBE (Testa et al., 2018). Studies conducted by Paillé Meija-Morelos (2019); Temminck et al. (2015) have found that POSE leads to OCBE. The third hypothesis is posited below:

H3. Perceived organizational support for the environment will be positively related to organizational citizenship behavior to the environment.

2.8 Environmental transformational leadership (ETL) and the environmental management system (EMS)

Theoretically, an EMS can be explained by two approaches (Heras-Saizarbitoria et al., 2011). One approach identifies factors existing in the external environment of the firm, such as

institutional and societal pressures, and international rules and regulations (Heras-Saizarbitoria *et al.*, 2016). The second approach identifies factors within the firm that lead it to embrace EMS, such as resources, business strategy, managerial skills, what is produced for the market, etc. (Melnyk *et al.*, 2003). Organizations are social entities comprising hierarchical structures which are formal or informal (Magee and Galinsky, 2008; Diefenbach and Sillince, 2011). Some individuals in both types are more influential due to their position, status, power and knowledge (Firth and Carroll, 2016). Individuals assuming leadership roles are in the category of influential organizational personnel (Ruben and Gigliotti, 2016). They are at the helm of affairs which affords them the responsibility, opportunity and mandate to impact the behaviors of employees and the organization as a whole (Pitelis and Wagner, 2019 and McGahan, 2019).

As the certification of the EMS is voluntarily adopted by green firms (Frondel *et al.*, 2018), we contend that such firms have environmental transformational leaders as they are morally convinced and internally motivated about the importance of being environmentally responsible (Bass and Bass Bernard, 1985; Chen and Chang, 2013; Robertson, 2018 and Robertson and Carleton, 2018). Based on scholars' (Chen and Chang, 2013; Robertson and Barling, 2015a, b) conceptualization of the environmental transformational leader, we argue that such a leader would not only willingly procure the certification of an EMS such as ISE 14001 but also strive to wholeheartedly execute it (Singh *et al.*, 2020). We assert that company leaders integrate prerequisites of the framework of environmental management system within the business, its processes, policies, culture and strategies, thereby internalizing them. Not just that, we further extend our argument about the positive relationship between ETL and EMS. We do this by asserting that such leaders constantly evaluate, oversee and try to improve the environmental performance of their firm in line with ISO 14001 (Singh *et al.*, 2020).

We also posit the relationship between ETL and EMS is based on previous evidence of the constructs and how they are dealt with in organizational processes and systems (Karam *et al.*, 2017). In a study by Singh *et al.* (2020), ETL was found to be related to green human resource practices, resulting in better environmental performance. Similarly, in the management literature, Sawaean and Ali (2020) recently found that entrepreneurial leaders utilize the organizational processes of total quality management (TQM) practices to improve how their company functions. On this basis, we develop the hypothesis:

H4. Environmental transformational leadership will be positively related to the environmental management system.

2.9 Environmental management system and organizational citizenship behavior toward the environment
Global awareness about environmental issues will enhance companies' sustainable performance (Zhang *et al.*, 2020). EMS implementation is a globally recognized framework of environmental standards (Ikram *et al.*, 2019). This framework is helpful regarding guidance for manufacturing businesses to become sustainable and reduce their impact on the environment (Phan and Baird, 2015). Researchers (Fuzi *et al.*, 2019) have suggested that these firms should be encouraged to embrace EMS to improve their performance. EMS is voluntarily adopted, and it has been proven to be a critical factor in the success of firms that seek to balance their finance and sustainability aspects (Bravi *et al.*, 2020). One empirical study found that EMS implementation can assist managers who want to please the expectations of stakeholders (Jiang *et al.*, 2020). Regardless of the size of firms, resource allocation is done to obtain the desired results and benefits from EMS. It results in improved business performance and a decline in environment-related costs (Wong *et al.*, 2020).

Firms that voluntarily implement the EMS witness tremendous enhancement in corporate environmental performance (Seifert and Guenther, 2020) and financial performance (Feng

and Wang, 2016; Voinea *et al.*, 2020). A few years ago, Kim *et al.* (2017) stated that apart from organizational actors (leaders and co-workers, for instance), the systems, processes, policies and procedures can stimulate the behavior of employees (Norton *et al.*, 2014; Gkorezis and Petridou, 2017; Kehoe and Wright, 2013). For example, employees may adjust according to the rules, regulations, policies and procedures out of habit. Conversely, employees reciprocate fair HR practices due to the norm of reciprocity as believed by social exchange theorists (Tang and Tang, 2012). Referring to counterproductive workplace behaviors, scholars have argued that unfavorable mechanisms can undermine the desired behaviors (Chen and Jin, 2014).

Sustainability scholars have mainly investigated the influence of what is known as green human resource practices on employees, and they found that they tend to result in PEBs (Luu, 2019). Another organizational mechanism is represented by corporate social responsibility, which is found to be influential in terms of employee PEBs such as organizational citizenship behaviors (Cheema *et al.*, 2019, 2020). Given the systems, procedures, policies, rules and regulations that guide what employees do, we contend that they will determine employees' behaviors (Khan *et al.*, 2020; Todaro *et al.*, 2019). We further argue that it will result in POSE. The discussion above leads to the following hypothesis given below:

H5. Environmental management system will be positively related to organizational citizenship behavior toward the environment.

2.10 A mediating role of perceived organizational support for the environment
Past research has investigated the direct effect of transformational environmental leadership on OCBE (Kim *et al.*, 2019; Robertson and Carleton, 2018). This study seeks to contribute to this stream of research by investigating the indirect effect of ETL on OCBE via perceived organizational support for the environment. The transformational leadership style influences employee-level outcomes through affective, motivational, identification, social exchange and justice enhancement mechanisms (see meta-analysis by Ng, 2017). We choose the construct of perceived organizational support for the environment because it is embedded in the social context of employees. Our study belongs to the line of inquiry in the leadership literature that seeks to probe social exchange as an underlying pathway connecting transformational leadership and employee-level outcomes. Prior studies have investigated the role of environmental belief (Kim *et al.*, 2019) and perceived environmental climate (Robertson and Carleton, 2018) as mediating pathways through which environmental transformational leadership affects OCBE. Relying on the theoretical prism of social exchange (Blau, 1964; Cropanzano *et al.*, 2017; Homans, 1961), we argue that as an agent representing a green organization, ETL elicits OCB from employees by putting organizational support systems in place and the appropriate socio-emotional resources (Graves and Sarkis, 2018; Mittal and Dhar, 2016). ETL does so through intellectual stimulation, idealized influence, individualized consideration and inspirational motivation (Graves *et al.*, 2019; Li *et al.*, 2020). We draw on the personification premise by Levinson (1965) to build our argument that employees who witness this support provided by ETL will equate this with the support provided by the organization. We concur with the recent research (Bavik *et al.*, 2020; Eisenberger *et al.*, 2020), who stated that perceived organizational support could spur and motivate employees to exert extra effort.

We rely on previous research in which perceived organizational support had been employed as a mediating mechanism. In a study by Zhong *et al.* (2016), it was found that workers who viewed their organization as supportive were more favorably inclined to engage in extra-role behaviors such as organizational citizenship behaviors. Linked to this, a transformational style of leadership has been documented as able to produce various employee-level outcomes, including empowerment (Yildirim and Naktiyok, 2017),

commitment to mission change (Weiherl and Masal, 2016), employability (Yizhong *et al.*, 2019), affective commitment (Stinglhamber *et al.*, 2015) and creativity (Anggiani, 2018 and Suifan *et al.*, 2018). It has also been reported that such leadership styles as servant leadership (Zhou and Miao, 2014), inclusive leadership (Qi *et al.*, 2019) and ethical leadership (Tan *et al.*, 2019) will elicit desired behaviors from their followers through an intervening construct of perceived organizational support. As well, human resource practices (Mayes *et al.*, 2017; Pohl *et al.*, 2019; Valeau and Paillé, 2019; Zhong *et al.*, 2016), procedural justice (DeConinck, 2010), organizational justice (Nazir *et al.*, 2019) and corporate social responsibility (Bouraoui *et al.*, 2019) make an impact on outcome variables through perceived organizational support. Green human resources practices have indirectly affected individual environmental performance through an underlying mediating mechanism of perceived organizational support (Paillé *et al.*, 2020). In a similar vein, this kind of support was conceptualized as a mediational mechanism between supervisor support for the environment, training, rewards and employees' PEBs (Montabon *et al.*, 2016). The preceding discussion leads to the following hypothesis:

H6. POSE mediates the relationship between environmental transformational leadership and OCBE.

2.11 A mediating role of the environmental management system
In developing relationships between constructs, sustainability researchers are not only required to specify direct paths between them but are also expected to integrate underlying mediating variables in their research models (Úbeda-García *et al.*, 2020). This integration can take the form of single mediation, parallel mediation and sequential mediation, among others (Hayes, 2018). Apart from hypothesizing the mediating role of POSE in the relationship between ETL and OCB, the present study also hypothesizes that environmental management system serves as the mediating variable in the relationship between ETL and OCBE.

Management scholars such as Sun and Henderson (2017) have argued that transformational leaders–like environmental transformational leaders–not only use psychological and social processes to influence their subordinates, but they also utilize organizational processes to get things done. We also proposed this mediational role of the EMS based on the ability-motivation-opportunity (AMO) theory (Pham *et al.*, 2019). According to Appelbaum *et al.* (2000), the conceptualization of AMO theory, consisted of three components (1) ability, (2) motivation, and (3) opportunity, this framework can motivate employees to execute green voluntary PEBs such as organizational citizenship behavior. The frameworks of the EMSs like ISO14001 cater to all three aspects of ability-motivation-opportunity as stated by AMO theorists (Yong *et al.*, 2019). EMSs are comprehensive (or should be comprehensive) as they entail the entire roadmap for the business to go green (Melnyk *et al.*, 2003; Du *et al.*, 2013). It requires certified businesses to train, evaluate, support, and it provides resources to their employees to perform PEBs (Ikram *et al.*, 2019).

Consequently, we argue that environmental transformational leaders use the potential of the EMS to enable company personnel to perform OCB. Specifically, individualized consideration of environmental transformational leaders seems to be particularly relevant (Chen and Chang, 2013; Robertson, 2018). This dimension deals with feedback, mentoring, coaching and support provided to employees (Chen and Chang, 2013; Robertson and Barling, 2015a, b). Other studies have found that leaders use organizational practices such as HRM practices to influence what employees do. More importantly, research has found support for the EMS to function as the mediating variable in the relationship between institutional pressures and economic and environmental performance (Jain *et al.*, 2020).

Thus, we propose the hypothesis given below:

H7. The environmental management system plays a mediating role in the relationship between environmental transformational leadership and organizational citizenship behavior towards the environment.

3. A methodology and research design

Bogdan and Biklen (2007) defined a research paradigm as a blend of related concepts, propositions and assumptions that build a philosophical perspective on a particular topic or problem (Cohen *et al.*, 2013). The research paradigm provides a pathway for developing new knowledge by establishing study aims, motivation and expectations (Saunders *et al.*, 2012). The positivist paradigm follows the scientific method of investigation and aims to test theories and proposed hypotheses through observation and measurement. This paradigm justifies the use of quantitative studies and methods (Creswell and Creswell, 2017). The quantitative research design employs a deductive approach, where the researcher develops a hypothesis with the ultimate objective to corroborate a theory or theories (Saunders *et al.*, 2012). According to Sekaran and Bougie (2016), the deductive approach is more appropriate for this type of investigation. Quantitative research examines the relationship between study variables using numerical, statistical, tabulated data (Creswell and Creswell, 2017) collected through survey instruments like questionnaires consisting of closed-ended information on variables, e.g. ETL, POSE, EMS and OCBE.

3.1 The target population and sample size

A total of 492 ISO14001-certified companies were registered in the FMM directory (FMM, 2018). So, the current study target population was 492 ISO14001-certified Malaysian manufacturing firms. Location-wise, for this study, they were in various regions, including the northern, central and southern parts of Peninsular Malaysia. Most were operating in the central region, i.e. Kuala Lumpur, Selangor and southern region, mainly in Johor and Malacca. This quantitative study used a statistical formula based on Krejcie and Morgan's (1970) method to generate a sample size of 216 from the target population of 492. "Simple probability random sampling" served this purpose, where each outcome is given an equal chance of being correct (Sekaran and Bougie, 2016) and enhances the generalizability of the results. Moreover, the outcomes of ETL, POSE, EMS and OCBE were evaluated at the organizational level. Key respondents for this study were the managers of the ISO14001-certified manufacturing firms.

3.2 Survey instruments

OCBE: Various scales have been devised (Lamm *et al.*, 2013; Robertson and Barling, 2017b; Tosti-Kharas *et al.*, 2017). However, for this study, we have chosen the 13-item scale developed by Boiral and Paillé (2012) because it is not specifically designed for any particular context or industry. Sample item includes "I spontaneously give my time to help my colleagues take the environment into account in everything they do at work." Environmental transformational leadership: numerous scholars (Graves and Sarkis, 2018; Kim *et al.*, 2019; Robertson and Barling, 2013) have constructed scales for environmental transformational leadership. However, we have chosen the six-item scale developed by Chen and Chang (2013) because it aligns with the operationalization of the construct in this study. A sample item is "The leader gets the organization members to work together for the same environmental goals." POSE: Several scales (Kim *et al.*, 2019; Lamm *et al.*, 2015; Paillé Valéau, 2020; Temminck *et al.*, 2015; Wesselink *et al.*, 2017) measuring perceived organizational support for the environment have appeared in the literature. This study used the six-term scale developed by Paillé Meija-Morelos (2019). A sample item is "My organization is willing to extend itself to solve an environmental problem." EMS: The EMS was measured using the 13-item scale invented by

Prajogo *et al.* (2012). A sample item includes "The implementation of ISO14001 has reduced risk of environmental hazards." The complete list of survey measures is documented in Appendix section A.

3.3 Data collection the and response rate
The researcher contacted the management of the manufacturing firms about the survey's purpose. Survey instruments were based on ETL, EMS, POSE and OCBE in the context of ISO14001 certification. They were given assurance that the responses will be kept confidential. The researcher distributed 350 questionnaires to the managers of ISO14001-certified Malaysian manufacturing firms. 234 responded, and this indicated a 67% response rate. An above 50% response rate is entirely acceptable and recommended for personally administered questionnaires (Sekeran, 2003).

4. Data analyses and results
The quantitative data analysis presents results and data interpretation through structural equation modeling (SEM) using SmartPLS 3.3.2 version. First, quantitative data were refined through certain data cleaning tests and procedures. During data entering, some questionnaires contained inappropriate and missing data; accordingly, seven (07) questionnaires were ineffective for subsequent analysis. Therefore, as Hair *et al.* (2010) recommended, such questionnaires were excluded. After deleting them, including eleven (11) outliers, the sample size became 216 that are enough for SEM analysis (Bell *et al.*, 2018; Bryman and Bell, 2015). PLS-SEM consisted of measurement and structural models. The quantitative data analysis comprises several steps and procedures.

4.1 The company background
The descriptive statistics analysis reported a total of nine manufacturing groups participated in this study, including: (1) food, beverages, and tobacco, (2) chemicals including petroleum, (3) electrical and electronics, (4) fabricated metals, (5) machinery, (6) plastics, (7) transport, (8) rubber and (9) others. The analysis revealed that major industrial groups in the sample were food, beverages and tobacco (20.4%), followed by electrical and electronics (18.5%), chemicals including petroleum (13.0) and fabricated metals (10.6%). However, the remainder of the industrial groups was less than 10%, including machinery (8.8%), transport (9.3%), rubber (6.5%) and others (2.8%). Details concerning the number of employees and years since establishment are highlighted (see Table 1).

4.2 A PLS-based structural equation modeling (SEM) approach
PLS-SEM is widely used in social science research (Ali *et al.*, 2018). The SEM technique is based on a two-model approach, i.e. assessing measurement and structural model using the SmartPLS 3.3.2 software (Hair *et al.*, 2010; Rezaei, 2015).

4.3 A measurement model
The measurement or outer model examines the relationship between the constructs and their indicators. To validate the measurement model, convergent and discriminant validity should be assessed. Initially, to establish convergent validity, three parameters were used: (1) the factor loading should be more than 0.7; (2) composite reliability (CR) should be greater than 0.7; (3) the value of an average variance extracted (AVE) should be more than 0.5. To adjust the model based on these parameters, this study used four reflective first-order constructs: ETL, POSE, EMS and OCBE. The partial least squares algorithm was calculated using maximum iterations, which should be sufficiently large (e.g. 300 iterations), while the stop criterion value should be sufficiently small, e.g. (7). The initial default measurement model consisted of four constructs measured through 37 items. CFA for all reflective constructs was

Industry companies type	Frequency	Percent	Cumulative percent
Food, beverages and tobacco	44	20.4	20.4
Chemical including petroleum	28	13.0	33.3
Electrical and electronics	40	18.5	51.9
Fabricated metal	23	10.6	62.5
Machinery	19	8.8	71.3
Plastic	22	10.2	81.5
Transport	20	9.3	90.7
Rubber	14	6.5	97.2
Other	06	2.8	100.0
Total	216	100.0	
Number of employees			
Less than 50	23	10.6	10.6
50–100	27	12.5	23.1
101–250	40	18.5	41.7
251–500	37	17.1	58.8
501–1,000	57	26.4	85.2
more than 1,000	32	14.8	100.0
Total	216	100.0	
Years of establishment			
Before 1970	08	3.7	3.7
1971–1980	15	6.9	10.6
1981–1990	46	21.3	31.9
1991–2000	44	20.4	52.3
2001–2010	63	29.2	81.5
2011–2020	40	18.5	100.0
Total	216	100.0	

Table 1.
The company
background

performed in SmartPLS 3.3.3. However, to establish convergent validity (CV) for each variable, the items with a loading less than 0.7 were removed (Hair *et al.*, 2014, p. 103). Almost 9 items were removed (i.e. ETL06, POSE04, POSE05, POSE06, OCBE04, OCBE13, EMS01, EMS11 and EMS13). Finally, the adjusted model with 28 items served to establish the convergent and discriminant validity (see Figure 2).

Once the model has been successfully built into the SmartPLS algorithm (300 maximum iterations, a path weighting scheme), the process is called *measurement model (outer model)* evaluation.

4.3.1 Convergent validity (CV). To assess the measurement model, first CV should be calculated based on three criteria: (1) the factor loading should be more than 0.7; (2) composite reliability (CR) should be greater than 0.7; (3) the value of an average AVE)should be more than 0.5. It is compared using alpha, composite reliability (CR) and extracted (AVE). The results confirmed that all the values are in the acceptable range (see Table 2). Next, discriminant validity (DV) was assessed.

4.3.2 Discriminant validity (DV). DV was assessed based on three parameters: (1) Fornell and Lacker criterion; (2) cross-loadings; (3) a heterotrait-monotrait ratio (HTMT) using SmartPLS DV output. Table 3 results confirmed that the diagonal value in (bold) of each construct, e.g. ETL, EMS, PSOE and OCBE, is greater than the inter-construct correlation values.

The second criterion to establish DV is assessing the cross-loading of each construct in their respective column. The loading of each item should be higher than their own construct compared to the loading of other constructs in individual rows. Table 4 reveals
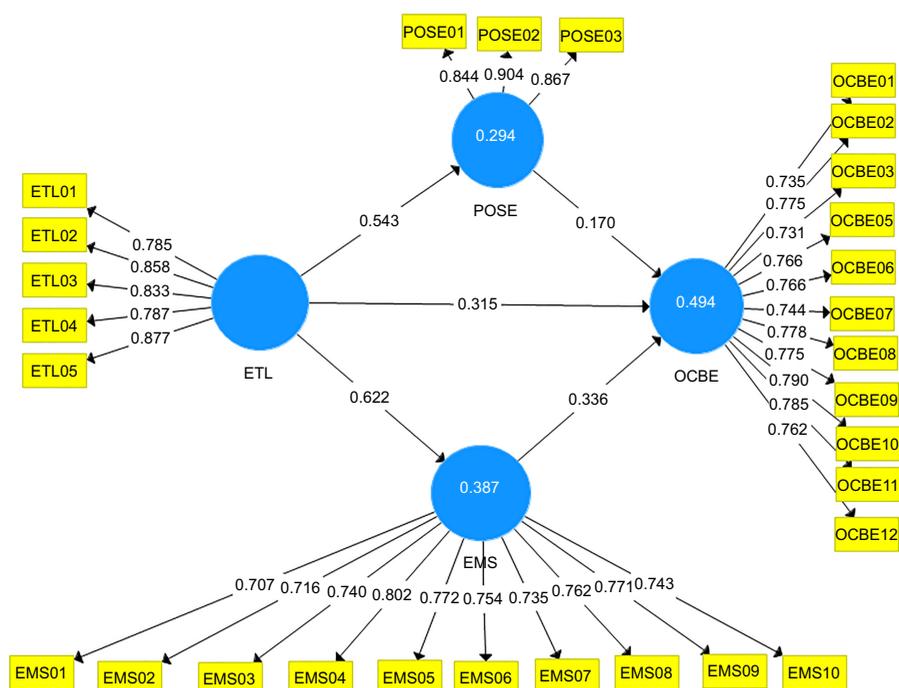
Figure 2.
A measurement model

that all items were loaded higher on their construct, which ultimately means there are no
DV issues.

4.3.3 The heterotrait-monotrait ratio (HTMT). The third criterion for assessing DV is to
check the HTMT ratio. Any value above 0.85 or 0.90 indicates DV, as shown in Table 5. All
values were below 0.85, thus confirming that DV does not exist (Kline, 2011).

4.4 An assessment of structural model
Once the measurement model was assessed using CV and DV, the next step is to validate the
structural model. This process includes key six steps: (1) collinearity assessment, (2) path
coefficient (β) indicating the strength of the relationships between constructs, (3) percentage
of variance explained or R square (R^2), which is traditionally called regression score, (4)
assessment of effect size f^2, (5) predictive relevance Q^2 and (6) q^2 effect size.

4.4.1 Assessing collinearity. Variance inflation factor (VIF) values were employed to assess
multicollinearity using SmartPLS output. The VIF value is higher than the five signs of high
collinearity. Table 6 shows that OCBE has the highest VIF value for the model, which was
1.825. This was below the threshold, subsequently confirming no collinearity issue existed in
the model

4.4.2 The path coefficient (β*) and* t-*values.* The path coefficient represents the hypothesized
relationship among the constructs in the structural model. The path coefficients have
standardized beta values (β) between -1 and $+1$ in a regression analysis (Hair *et al.*, 2014,
p. 171). To further test the proposed hypotheses (H1, H2, H3, H4, H5, H6 and H7),
bootstrapping was employed SEM using SmartPLS with 5,000 iterations and calculated path
coefficients (β). Meanwhile, the t-values, their significance levels and p values were calculated,
as highlighted in Figure 3.

Construct	Items	Factor loadings	CR	AVE
EMS	EMS01	0.707	0.928	0.564
	EMS02	0.716		
	EMS03	0.740		
	EMS04	0.802		
	EMS05	0.772		
	EMS06	0.754		
	EMS07	0.735		
	EMS08	0.762		
	EMS09	0.771		
	EMS10	0.743		
ETL			0.916	0.687
	ETL01	0.785		
	ETL02	0.858		
	ETL03	0.833		
	ETL04	0.787		
	ETL05	0.877		
OCBE	OCBE01	0.735	0.939	0.585
	OCBE02	0.775		
	OCBE03	0.731		
	OCBE05	0.766		
	OCBE06	0.766		
	OCBE07	0.744		
	OCBE08	0.778		
	OCBE09	0.775		
	OCBE10	0.790		
	OCBE11	0.785		
	OCBE12	0.762		
POSE	POSE01	0.844	0.905	0.761
	POSE02	0.904		
	POSE03	0.867		

Table 2.
A convergent validity assessment

Note(s): Environmental transformational leadership (ETL), organizational citizenship behavior toward environment (OCBE), perceived organizational support for the environment (POSE) and the EMS (EMS)

	EMS	ETL	OCBE	POSE
EMS	*0.751*			
ETL	0.622	*0.829*		
OCBE	0.626	0.616	*0.765*	
POSE	0.551	0.543	0.526	*0.872*

Table 3.
Fornell and Lacker criterion using inter correlation matrix of constructs

*Note(s): The square root of AVE of every multi-item construct is shown on the main diagonal

4.4.3 A hypothesis testing (direct effects). As depicted in Table 7 H1: ETL is positively related with OCBE (β = 0.315; t = 4.331, p-value 0.000) H2: ETL positively related with POSE (β = 0.543; t = 10.753, with p-value 0.000 was also supported. H3: POSE is positively related with OCBE (β = 0.170; t = 2.328, p-value 0.010. H4: ETL is positively related with EMS (β = 0.622; t = 14.021, p-value 0.000 H5: EMS is positively related with OCBE (β = 0.336; t = 4.545, p-value 0.000. In the next section the results of the mediation hypotheses H6 and H7 are discussed.

	EMS	ETL	OCBE	POSE
EMS01	0.707	0.431	0.468	0.358
EMS02	0.716	0.458	0.466	0.428
EMS03	0.74	0.38	0.455	0.404
EMS04	0.802	0.433	0.433	0.424
EMS05	0.772	0.502	0.445	0.391
EMS06	0.754	0.463	0.453	0.431
EMS07	0.735	0.458	0.42	0.345
EMS08	0.762	0.502	0.484	0.393
EMS09	0.771	0.533	0.557	0.447
EMS10	0.743	0.484	0.491	0.501
ETL01	0.453	0.785	0.483	0.435
ETL02	0.514	0.858	0.544	0.497
ETL03	0.535	0.833	0.602	0.431
ETL04	0.539	0.787	0.393	0.449
ETL05	0.535	0.877	0.517	0.437
OCBE01	0.453	0.51	0.735	0.462
OCBE02	0.444	0.412	0.775	0.393
OCBE03	0.472	0.436	0.731	0.414
OCBE05	0.495	0.518	0.766	0.464
OCBE06	0.434	0.476	0.766	0.414
OCBE07	0.393	0.429	0.744	0.365
OCBE08	0.507	0.44	0.778	0.386
OCBE09	0.446	0.451	0.775	0.389
OCBE10	0.49	0.417	0.79	0.324
OCBE11	0.519	0.529	0.785	0.391
OCBE12	0.578	0.528	0.762	0.4
POSE01	0.505	0.533	0.497	0.844
POSE02	0.418	0.429	0.428	0.904
POSE03	0.508	0.442	0.44	0.867

Table 4.
Cross-loadings

	EMS	ETL	OCBE	POSE
EMS				
ETL	0.688			
OCBE	0.672	0.671		
POSE	0.621	0.622	0.587	

Table 5.
The hetrotrait-
monotrait
ratio (HTMT)

	EMS	ETL	OCBE	POSE
EMS	–	–	1.824	–
ETL	1.000	–	1.794	1.000
OCBE	–	–	–	–
POSE	–	–	1.588	–

Table 6.
Collinearity
assessments

4.4.4 A hypothesis testing (indirect effects/mediation). The current study proposed two
mediation path hypotheses, i.e. (1) H6: ETL → POSE→ OCBE, (2) H7: ETL → EMS → OCBE.
As depicted in Table 8 H6: POSE mediates the relationship between ETL and OCBE (*indirect
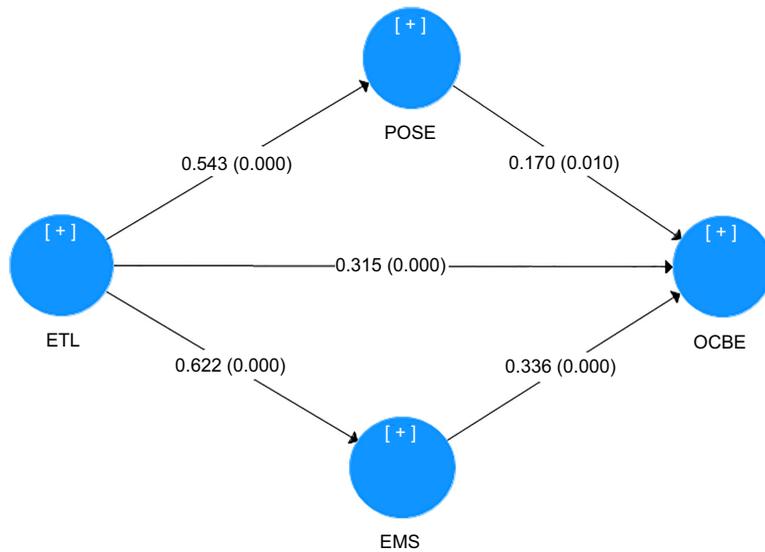β* = 0.092; *t* = 2.152, *p*-value 0.016), while H7: EMS mediates the relationship between ETL

Figure 3.
Bootstrapping output
for structural model
with path coefficient (β)
and p-value

S.NO	Hypotheses	B	t-value	p-value	Decision
H1	ETL → OCBE	0.315	4.331	0.000	Supported
H2	ETL → POSE	0.543	10.753	0.000	Supported
H3	POSE → OCBE	0.170	2.328	0.010	Supported
H4	ETL → EMS	0.622	14.021	0.000	Supported
H5	EMS → OCBE	0.336	4.545	0.000	Supported

Table 7.
Results of a structural
model and a direct
hypothesis testing

S.NO	Hypothesis	Indirect β	t-value	p-value	Decision
H6	ETL → POSE → OCBE	0.092	2.152	0.016	Supported
H7	ETL → EMS → OCBE	0.209	4.307	0.000	Supported

Table 8.
A hypothesis testing
(test of indirect effects/
mediation)

and OCBE (*indirect* β = 0.209; t = 4.307, p-value = 0.000). Table 4.17 shows that both mediation hypotheses were supported.

The next step is to compute the variance accounted for (VAF) as the ratio between indirect and direct effect to determine the strength of this mediation. The VAF complements the assessment of mediation through the bootstrapping procedure. The VAF > 80% indicates full mediation, 20% = VAF ≥ 80% shows partial mediation, while VAF < 20% assumes there is no mediation. The calculation of variance accounted for (VAF) for this study is summarized in Table 9).

4.5 Explanatory power of the model (R^2), predictive relevance Q^2 and effect size (q^2)
The R^2 values of the endogenous latent variables (EMS, POSE and OCBE) reflect the model's explanatory power in terms of how much the endogenous variables are explained by the exogenous variable ETL. The R^2 values are such that $0 < r^2 < 1$, indicating higher levels

S. No	Hypotheses	Direct β	Indirect β	A variance account for (VAF %)	Mediation
H6	ETL → POSE → OCBE	0.315	0.092	Direct effect of ETL → OCBE = 0.315 Indirect effect of ETL → POSE → OCBE = 0.092 Total effect = direct effect Indirect effect = 0.315 + 0.092 = 0.407 VAF = Direct effect/total effect = 0.315 / 0.407 = 0.773 *VAF = 77%*	Partial
H7	ETL → EMS → OCBE	0.315	0.209	Direct effect of ETL → OCBE = 0.315 Indirect effect of ETL → EMS → OCBE = 0.209 Total effect = direct effect Indirect effect = 0.035 + 0.209 = 0.524 VAF = Direct effect/total effect = 0.315/ 0.524 = 0.601 *VAF = 60%*	Partial

Table 9.
Variance account for (VAF) calculation

of predictive accuracy (Hair *et al.*, 2014, p. 174). The R^2 value for the OCBE was 0.494, meaning that ETL, POSE and EMS together explain 49% variation in OCBE.

4.6 Predictive relevance Q^2

In addition to R^2, another criterion proposed by Stone-Geisser's Q^2 is also used for predictive relevance (Geisser, 1974; Stone, 1974). The Q^2 is calculated by using the blindfolding procedure. It is a sample reuse technique where data points are omitted and re-estimated. Thus, Q^2 shows how well the data collected empirically can be re-constructed with model and PLS paraments (Akter *et al.*, 2011). A Q^2 value greater than zero for a specific reflective endogenous latent variable indicates the path model's predictive relevance for a dependent variable. As shown in Table 10, Q^2 for OCBE was 0.279, EMS 0.211 and POSE 0.215, indicating an acceptable level of predictive relevance. Overall, the model has satisfactory Q^2, which further confirms the predictive relevance of the structural model.

4.7 Effect size q^2

The Q^2 value shows models predictive relevance of the path model. However, it does not show the relative impact of predictive relevance. To establish relative importance, q^2 effect size is calculated: $q^2 = (Q^2_{included} - Q^2_{excluded})/(1 - Q^2_{included})$. e.g. ETL $q^2 = (0.279 - 249)/(1 - 0.279) = q^2$ effect size 0.041. These calculations of q^2 were repeated for all constructs, as shown in Table 11.

4.8 The PLS-SEM importance-performance matrix analysis (IPMA)

The important performance map analysis (IPMA) extends the usual PLS-SEM results by considering average values of the latent scores (Ringle and Sarstedt, 2016). IPMA analysis

Endogenous variables	R^2 values	Threshold	Q^2 values	Threshold
POSE	0.294	≥0.33 (moderate)	0.215	>0
EMS	0.387	≥0.33 (moderate)	0.211	>0
OCBE	0.494	≥0.67 (substantial)	0.279	>0

Table 10.
R^2, predictive relevance Q^2

helps to identify the importance of a construct in predicting a target construct and how well it performs. In the current study, the IPMA was conducted for OCBE performance as a specific endogenous latent variable alongside exogenous construct, i.e. ETL, POSE and EMS on the x-axis and index values of OCBE, i.e. the y-axis (Hair *et al.*, 2014; Hock *et al.*, 2010). Table 12 exhibits the latent variables' index values in the inner model and the exogenous latent variables' total effects (indicating direct effects in this specific case) on the endogenous latent variable "OCBE."

Figure 4 illustrates the IPMA map of OCBE and the relevant IPMA analysis showed that all key latent variables, i.e. ETL, POSE and EMS, are important in determining OCBE. POSE has the highest value, i.e. 63.279 among all.

4.9 The goodness of a fit
Overall model fit is a criterion to assess how well hypothesized models fit the data and help identify model misspecification. In PLS-SEM, a standardized mean square residual (SRMR)

Structural path	Q^2 excluded	Effect size (q^2)	Rating
ETL → OCBE	0.249	0.041	Small
POSE → OCBE	0.270	0.012	Small
EMS → OCBE	0.246	0.045	Small

Table 11.
Effect size q^2

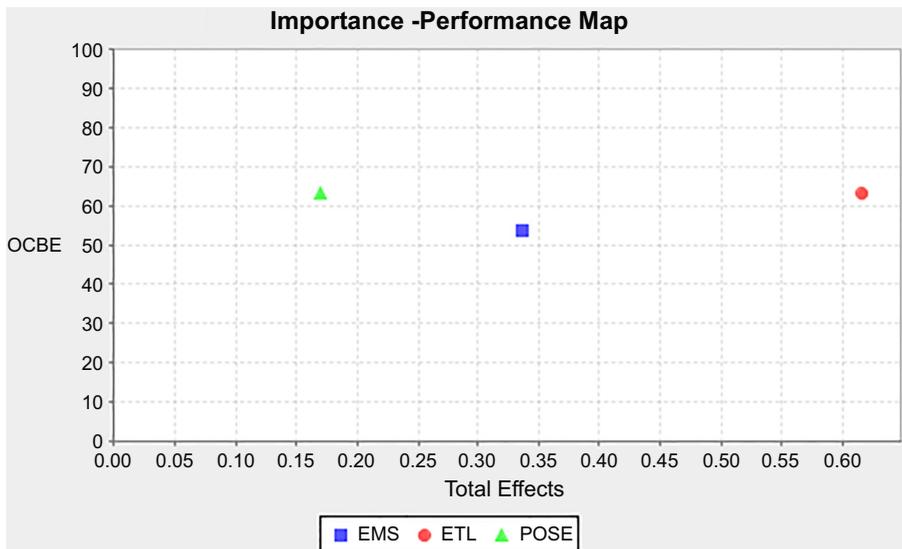| Latent variables	OCBE total effect performance	Index value performance
EMS	0.336	53.89
ETL	0.616	63.155
POSE	0.17	63.297

Table 12.
Impa results

Figure 4.
The IPMA map
of OCBE

criterion is proposed to measure model fit (Henseler *et al.*, 2014). SRMR is an absolute measure of fit, and therefore, the value of zero represents perfect fit. A value of less than 0.08 is considered a good fit (Hu and Bentler, 1998). Another method is also proposed, and it can be utilized to assess model fit and root mean square residual covariance (RMS_{theta}). The value of RMS_{theta} below 0.12 shows a well-fitting model (Henseler *et al.*, 2014). For the present model, the values of both SRMR and RMS_{theata} were 0.058 and 0.11, respectively, which confirms a good fit for the model, as shown in Table 13.

5. The discussion and findings
The present study dealt with a lack of literature on a particular type of voluntary pro-environmental behavior called OCBE. It followed the calls by scholars (Anser *et al.*, 2020 and Kim *et al.*, 2019) for more research on leadership's role in promoting OCBE, and it is related to ETL and OCBE. Moreover, researchers need to propose more mediating variables (Chen *et al.*, 2014a, b and Kura, 2016). This study filled this gap in the literature by proposing that environmental transformational leaders generate good OCB through dual, parallel mediation mechanisms of perceived organizational support. The theoretical foundation of the research framework integrated social exchange theory (Blau, 1964; Cropanzano *et al.*, 2017 and Homans, 1961) and ability motivation theory (Appelbaum *et al.*, 2000). ISO14001-certified manufacturing firms in Malaysia were chosen for the data collection.

Hypothesis one was based on the relationship between ETL and OCBEThe findings of SEM supported the hypothesis, and it agrees with findings reported elsewhere on the relationship between ETL and OCBE (Kim *et al.*, 2019; Robertson and Carleton, 2018). Based on the literature, it can be argued that the findings seem plausible as managers who adopt an environmental transformational leadership style focus on the intrinsic motivation of employees to care for environment-related issues. Such ETL-oriented managers motivate their personnel to go beyond the job's minimum requirements on these matters. The findings, therefore, appear to be plausible (Chen *et al.*, 2014a, b).

The second hypothesis proposed that ETL leads to an increase in the perceptions regarding POSE. The findings were similar to other research which analyzed the relationship between leadership and perceived organizational support (Kurtessis *et al.*, 2017; Weiherl and Masal, 2016; Yildirim and Naktiyok, 2017). Managers with an environmental transformational leadership style embody green organizations. Thus, employees construe their supportive behaviors as being sanctioned by the boss (Eisenberger *et al.*, 2020; Robertson and Barling, 2015b). Such managers signal to employees that they care about the environment and provide resources for performing green voluntary PEBs (Lamm *et al.*, 2015). The findings generated from SEM regarding hypothesis two, thus, seem rational and logical.

Hypothesis three proposed that POSE results in OCB. The findings generated from SEM supported the interrelationship between the aforementioned constructs. Scholars in the past have documented similar results and found support for the connection between perceived organizational support and organizational citizenship behaviors (Thompson *et al.*, 2020 and

	Saturated models	Estimated models
SRMR	0.06	0.07
d_ULS	1.353	1.83
d_G	0.575	0.602
Chi-square	683.772	695.39
NFI	0.824	0.821
Ms theta		0.120

Table 13.
A model fit value

Wesselink *et al.*, 2017). The findings are justifiable based on the social exchange theory (Blau, 1964; Cropanzano *et al.*, 2017 and Homans, 1961). Accordingly, when employees develop perceptions that as representatives of their organizations, they will help the environment, they tend to engage in extra-role behaviors (Eisenberger *et al.*, 2001; Lamm *et al.*, 2015 and Robertson *et al.*, 2015). Such voluntary and extra-role behaviors emerge in the form of OCBE (Boiral and Paillé, 2012; Raineri and Paillé, 2016). Thus, the findings remain plausible.

The fourth hypothesis proposed that ETL will be positively related to the EMS. The SEM process yielded results that supported the hypothesized relationship and were in alignment with previous studies that examined the relationship between leadership and organizational mechanisms (systems, procedures, processes, policies and regulations) (Karam *et al.*, 2017). The findings seem to be having plausibility as various scholars have pointed out the potential and ability of leaders to influence these mechanisms (Sun and Henderson, 2017).

The fifth hypothesis proposed there is a positive association between the EMS and OCB. The SEM procedure resulted in the finding that supported the hypothesis. The results were similar to studies concluding that organizational mechanisms can determine employees' attitudes, emotions, behaviors and performance (Afsar *et al.*, 2018; Kehoe and Wright, 2013; Luu, 2019). Thus, we posit that our findings are plausible.

The sixth hypothesis proposed the mediating role of perceived organizational support for the environment on the relationship between ETL and OCB. The findings generated from the SEM analysis do support the hypothesis. Other scholars have found support for a similar hypothesis involving relationships that conceptualized perceived organizational support as a mediating variable in the relationship between leadership and organizational citizenship behaviors (Anggiani, 2018; Suifan *et al.*, 2018). The findings are viable in that leaders are the embodiment of the organization and looked up to by the staff for inspiration (Eisenberger *et al.*, 2010, 2014). Environmental transformational leaders provide both tangible and intangible resources to their employees (Chen *et al.*, 2014a, b; Chen and Chang, 2013; Lamm *et al.*, 2015; Robertson *et al.*, 2015; Robertson and Barling, 2013).

The seventh hypothesis proposed the mediating role of the environmental management system in the relationship between environmental transformational leadership and organizational citizenship behavior. The SEM results suggested the hypothesis to be true and findings agreed with other studies (Sun and Henderson, 2017) concluding that organizational mechanisms play a mediational role in the relationship between leadership and employee-level outcomes. The findings seem plausible based on what other scholars (Karam *et al.*, 2017; Sun and Henderson, 2017) reported.

5.1 Research implications

The current research has theoretical and practical implications for the managers of green firms in Malaysia. This study proposed its dual parallel mediating hypotheses by integrating the social exchange theory and ability-motivation theory. Previous research in this domain has incorporated the theoretical lens of self-determination (Kim *et al.*, 2019), pro-environmental climate theory (Robertson and Carleton, 2018) and self-determination theory (Kim *et al.*, 2019). The current study hypothesized that POSE and the EMS could explain the relationship between ETL and OCB regarding the environment. Another contribution is that unlike prior research (Kim *et al.*, 2019; Robertson and Carleton, 2018), which has mainly relied on the mediating variables that were psychological or social in nature, the current study proposed an organizational mechanism (i.e. EMS) as mediating the relationship between ETL and OCB. While prior studies incorporated single mediators (Kim *et al.*, 2019; Robertson and Carleton, 2018) in their frameworks, this study included a parallel mediating mechanism consisting of a psychological mediating mechanism and an organizational mediating mechanism.

The present study offers evidence-based lessons for the managers of ISO 4001-certified manufacturing firms. The managers of such companies need to embrace an environmental transformational leadership style because it motivates their employees to perceive that their organization cares about the environment and provides resources for how to safeguard it. That, in turn, leads them to perform voluntary PEBs. The study also reveals that apart from the psychological mechanism of perceived organizational support for the environment, such managers need to make use of an EMS that provides employees with resources, evaluation, feedback, coaching, recruitment, training and development. Using organizational processes in tandem with an EMS can result in voluntary PEBs.

5.2 Limitations and future directions
This study has its strengths as well as limitations. This study used cross-sectional primary data collected from manufacturing firms. The results cannot be generalized to other industries. Longitudinal and multi-wave data can be more beneficial for future studies (Sekaran and Bougie, 2016). We, therefore, suggest future researchers replicate the model in different countries and industries to enhance the generalizability of these findings. The current study used a relatively small sample, although it was sufficient for SEM analysis. Future studies should use larger samples and demographic variables as moderators, such as firm size and the number of employees.

5.3 Conclusions
Organizations are integrating sustainability practices and PEBs to reduce their negative impact on the environment. This study has highlighted the role of leadership in motivating employees to take up OCBE. Based on previous literature, ETL is an important predictor of OCBE. The purpose of this study was to investigate the mediating role of EMS and POSE in the relationship between ETL and OCBE among ISO14001-certified Malaysian manufacturing firms. This study filled a gap in the literature by testing this mediating effect through the theoretical lenses of the social exchange theory (Blau, 1964; Cropanzano *et al.*, 2017; Homans, 1961) and the ability-motivation theory (Appelbaum *et al.*, 2000). The study tested seven hypotheses. Overall, the findings confirmed there is a significant direct positive relationship between ETL and OCBE. This study also confirmed the mediating role of EMS and POSE on the relationship between ETL and OCBE among this study's ISO14001-certified manufacturing businesses. This research has important implications for both managers and organizations. The manufacturing firms should change the traditional OCB so that it results in pro-environmental OCBE using key antecedents, i.e. ETL, EMS, and POSE. The managers of environmentally friendly manufacturing firms need to embrace ETL and put in place an EMS that supports employees in terms of providing resources, evaluation, feedback, coaching, recruitment, training and development issues related to caring for the environment.

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Appendix

The key constructs of this study, e.g. ETL, OCBE, POSE and EMS, were measured with a five-point Likert scale (trongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5).

Environmental transformational leadership (ETL)

ETL01: My manager inspires the organization members with environmental plans.

ETL02: My manager provides a clear environmental vision for the members to follow.

ETL03: My manager gets the organization members to work together for the same environmental goals.

ETL04: My manager encourages the organization members to achieve environmental goals.

ETL05: My manager acts considering environmental beliefs of the organization members.

ETL06: My manager stimulates the organization members to think about green ideas.

Organizational citizenship behavior toward the environment (OCBE)

OCBE01: I spontaneously give my time to help my colleagues take the environment into account in everything they do at work.

OCBE02: I encourage my colleagues to adopt more environmentally conscious behavior.

OCBE03: I encourage my colleagues to express their ideas and opinions on environmental issues.

OCBE04: I spontaneously speak to my colleagues to help them better understand environmental problems.

OCBE05: Even when I am busy, I am willing to take time to share information on environmental issues with new colleagues.

OCBE06: I actively participate in environmental events organized in and/or by my company.

OCBE07: I undertake environmental actions that contribute positively to the image of my organization.

OCBE08: I volunteer for projects, endeavors or events that address environmental issues in my organization.

OCBE09: In my work, I weigh the consequences of my actions before doing something that could affect the environment.

OCBE10: I voluntarily carry out environmental actions and initiatives in my daily work activities.

OCBE11: I make suggestions to my colleagues about ways to protect the environment more effectively, even when it is not my direct responsibility.

OCBE12: I suggest new practices that could improve the environmental performance of my organization.

OCBE13: I stay informed of my company's environmental initiatives.

Perceived organizational support for the environment (POSE)

POSE01: The organization takes pride in my environmental accomplishments at work.

POSE02: My colleague really cares about my view on the environment.

POSE03: The organization values my environmental contribution.

POSE04: My organization is willing to assist employees in solving environmental problems.

POSE05: My organization is willing to extend itself to solve an environmental problem.

POSE06: Help is available in my company when environmental problems arise.

Environmental management system (EMS: ISO14001)

EMS01: To meet customer demands.

EMS02: To comply with government policy or regulations.

EMS03: To match competitors' actions.

EMS04: To improve environmental performance.

EMS05: To improve efficiency and control in the operations.

EMS06: To build synergies among management systems.

EMS07: Reduced pollution

EMS08: Reduced energy and material consumption

EMS09: A reduced risk of environmental hazards

EMS10: An improved public image

EMS11: Improved relations with stakeholders

EMS12: Improved customer satisfaction

EMS13: Improved market opportunities

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