The Influence of Organizational Green Climate on Employees' Green Behaviors: Evidence from the Eco Port of Kaohsiung

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Abstract

This research identifies the constructs and measures of organizational green climate and examines its influence on employees' green behaviors. This paper has used survey data collected from 164 respondents who are working at the Eco Port of Kaohsiung in Taiwan. An exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) revealed that there are four green climate dimensions: green port policy, green training, green communication, and green motivation. A structural equation modeling (SEM) was conducted to examine the effects of organizational green climate dimensions on employees' green behaviors. Study findings have indicated that organizational green climate dimensions are positively related to employees' green behaviors. The results have suggested that green motivation has the most important influence on employees' green behaviors, followed by green port policy, green communication and green training. Theoretical and practical implications of the research findings for the development of organizational green climate are discussed.

Keywords: Port; Organizational Green Climate; Green Behavior; Structural Equation Modeling

1. Introduction

Seaports play a key role in the global supply chain and sea transportation network. Seaports are also vital to the world's economy as more than 90% of the global trade is carried by sea and via port operations (International Maritime Organization, 2015). However, the dramatic growth in the use of seaports has led to environmental issues, such as hazardous wastes, noise, air and oil pollution (Lam and Notteboom, 2014). A number of studies on the examination of the environmental management, green port policy, and sustainability at ports has been growing (Acciaro, 2014; Chang and Wang, 2012; Davarzani et al., 2015; Gupta et al., 2005; Lam and Notteboom, 2014). For example, Gupta et al. (2005) suggested that environmental management plan for a port and harbour included the details of the safety organization and safety measures, information on the generation of liquid and gaseous effluents, and solid waste. Acciaro et al. (2014) proposed an innovative conceptual framework for evaluating the

environmental sustainability of ports. Many port operators are implementing proactive and strategic tools for environmental management which include policy and commitment, plan, implementation, measurement and evaluation, action and monitoring plans and review (The Port of Los Angeles, 2008; U.S. Environmental Protection Agency, 2007). While prior studies on environmental management or green port policy have focused on the technological aspects, the majority of environmental disasters and accidents appear to be caused by employees' improper behaviors and attitudes (Hoyos, 1995; Lu and Yang, 2011; Mullen, 2004).

While environment is becoming an important issue for business growth, performance, and sustainability, we argue that creating an organizational context that emphasizes values toward the green in such a way that employees have shared perceptions of those organizational climates is therefore an imperative. There are a growing number of researches that demonstrate the role of organizational climate in achieving organizational goals (Clarke, 2006; Neal et al., 2000; Lu and Shang, 2005; Lu and Tsai, 2008; Lu and Yang, 2011; Norton et al., 2014; Shneider, 1975; Zohar, 1980). Recently, a number of researchers are interested in and have highlighted the need for the formulation of organizational green climate to encourage employees' green behaviors in the workplace (Norton et al., 2014; Norton et al., 2015). However, it seems that there is relatively little research effort to develop a model to examine the relationships between organizational green climate and employees' green behaviors in the port context. In this regard, the development of such a model could serve to benefit theoretical research and facilitate the practical pursuit of environmental management in the shipping, port and transport logistics.

In order to fill up this gap, this research builds on the notion of organizational climate and the theory of planned behavior (TPB) (Ajzen, 1991), the theory of normative conduct (TNC) (Cialdini et al., 1990), social exchange theory (Cropanzano and Mitchell, 2005), and motivation theories (Graves et al., 2013) to highlight the theoretical mechanism forming the relationships between organizational green climate and employees' green behaviors. Organizational climate refers to the shared perceptions about organizational values, norms, beliefs, practices and procedures (Guldenmund, 2000). An organizational climate is a group of measurable work environment properties which comprise leadership, roles, and communication (James and McIntyre, 1996). Morrison (1997) suggested that organizational members affect organizational climate through knowledge and skill training. Organizations impart information to their employees through internal, formal and informal policies, and measures and procedures to ensure they understand their individual work objectives within the organization (Reichers and Schneider, 1990). An organizational climate can be explained by the behavioral models supported by organizations (Brown and Leigh, 1996). Organizational climate is a characteristic phenomenon within organizations including policies, training, leadership, communication, emergency preparedness, and motivation (Hetherington et al., 2006; Lu and Yang, 2011; Shang et al., 2011).

Daily and Huang (2001) suggested organizational green factors, such as environmental training, employee empowerment, teamwork, rewards systems, and top management support are as the critical elements of the implementation success of an environmental management system. It is vital for organizations to stablish an organizational climate that is highly conscious of the green or an environmental climate (Johnson and Miller, 2012; Milliman, 2013). Norton et al. (2015) proposed the concept of a "green group climate" and believed that a green work climate was vital in understanding employees' green behavior. Norton et al. (2012) also demonstrated the effects of the organizational sustainability policies upon employee green behavior by using work climate as the moderator variable. The notion of organizational green climate is particularly useful in understanding employees' green behavior, and it has been meaningfully employed by environmental management researchers (e.g., Acciaro, 2014; Chang and Wang, 2012; Davarzani et al., 2015; Lam and Notteboom, 2014; Norton et al., 2015). This research builds on previous studies and extends that work by conceptualizing and validating four dimensions of organizational green climate: (1) green policy, (2) green training, (3) green motivation, and (4) green communication. Furthermore, we examine these four on employees' green behaviors in the port context.

This research specifically focuses on the investigation of employees' perceptions of organizational green climate and green behavior at the Port of Kaohsiung in Taiwan. In terms of the number of container throughput, Kaohsiung Port ranked the 14th largest container port in the world in 2013 with a positive growth of 1.6% in throughput i.e. 9.93 million TEUs (twenty-foot equivalent unit) (UNCTAD, 2014). The Port of Kaohsiung was certified by the European Sea Ports Organization (ESPO) in October 2014 and became the first Eco Port in the Asia-Pacific Region. An empirical study of the Port of Kaohsiung can provide green port policy makers and port operators in the field the data to further improve the port environment. To address the research objectives, the following key research questions are formulated: (1) How to construct and identify the dimensions or measures for the organizational green climate and employees' green behaviors at seaports? (2) How does organizational green climate influence employees' green behaviors? (3) What are the mechanisms through organizational green climate to explain the variation of employees' green behaviors? Accordingly, this research aims to examine organizational green climate and its influence on employees' perceptions of green behavior in the port context. Built on the organizational climate related literature, dimensions such as green port policy, green training, green communication, and green motivation are examined in this research.

Following this introductory section, the next section presents a theoretical background based on previous literature and research hypotheses. An explanation of the methodology is discussed in the third section. The results from the data analysis based on a questionnaire survey are presented in the fourth section. Discussions and conclusions drawn from the analyses and managerial implications are addressed in the final section.

2. Theoretical Background and Research Hypotheses

This study based on four theories to explain employees' green behaviors, namely: theory of planned behavior (TPB) (Ajzen, 1991), the theory of normative conduct (TNC) (Cialdini et al., 1990), social exchange theory (Cropanzano and Mitchell, 2005), and motivation theories (Graves et al., 2013). The TPB is derived from the theory of reasoned action (TRA) which is a commonly studied model derived from social psychology that is related to the determinants of consciously intended behaviors (Ajzen and Fishbein, 1980). Ajzen and Fishbein (1980) explained that a person's performance of a specified behavior is determined by his or her behavioral intention to perform the behavior, and behavioral intention is jointly determined by the person's attitudes and subjective norms. TPB considers perceived behavioral control over engaging in the behaviors as an additional factor influencing intention. According to TPB, a person's behavior can be explained by his or her behavioral intention, which is jointly affected by subjective norms, attitude, and perceived behavioral control (Bissing-Olson et al., 2013). The TPB is one of the prominent frameworks to explain employees' green behaviors within an organization. We argue that positive attitudes of organizational green climate will have positive influence on employees' green behaviors based on the theory of TPB.

TNC refers to the extent to which a behavior is seen to be socially acceptable (Cialdini et al., 1990; Norton et al., 2015). Social norms within an organization are formulated via employees' recognitions of workplace climate. These perceptions include organizational policies, the procedures that translate these policies into guidelines, the rewards and motivation of workers' green behaviors. Employee perceptions of organizational norms reflect individual value-based schemas used to interpret behavioral norms and espoused values (Norton et al., 2014). Subjective norm is also one of the vital dimensions in TPB.

The theory of social exchange is characterized by a perceived obligation on the part of members to reciprocate quality relationships (Cropanzano and Mitchell, 2005). A good relationship or exchange is built on high levels of interaction, trust, support, and rewards that extend beyond what is specified in the normal job description (Dienesch and Liden, 1986; Liden et al., 1997). Essentially, employees in a high quality of leader-member relationship will give feedback to their leaders or supervisors by participating in green behaviors that benefit the leader and other colleagues within an organization (Liden et al., 1997). Hence, a high quality of social relationship will foster the set of employees' green behaviors. Social exchange theory has recently been applied to explain the nature of environmental behavior (Norton et al., 2015; Paillé et al., 2015).

Motivation theories refer to the mechanism through which context and individual factors affect behavior. The motivation to engage in a behavior can be controlled and be autonomous (Deci and Ryan,

1987). Employee behavior is likely to be borne out of a sense of autonomy that the actor actually wants to participate in the behavior. Therefore, autonomous motivation is associated with behaviors and is likely to strengthen positive behavior. On the other hand, controlled motivation refers to a sense of pressure and the experience of duty (Deci and Ryan, 1987). Individual behavior is likely to be conducted by a sense that he or she has to behave in a specific way. In this study, we would expect that organizational green climate can promote an autonomous motivational state when an employee wants to do something for the goodness of environment.

2.1. Employees' Green Behaviors

Based on the study of Bissing-Olson et al. (2013), Norton et al. (2014) identified two types of employee green behavior: self-report task-related and proactive/voluntary employee green behavior (EGB). Task-related EGB refers to a green behavior shown within the context of employees' required job duties, whereas proactive EGB is involving personal initiative that exceeds organizational expectations (Norton et al., 2015). Task-related EGB is the core activities that need to be carried out by individuals to protect workplace environment. These activities include adhering to organizational policies and creating environmental products and processes (Norton et al., 2015). Proactive EGB describes behaviors that do not directly contribute to a personal benefit but which help to develop an approach that supports the environmental protection. These behaviors include prioritizing environmental interests, initiating environmental policies and programs, activism, participating in voluntary green activities, helping co-workers to deal with environmental issues, and attending meetings held for discussion on environmental issues (Norton et al., 2012; Norton et al., 2015; Ones and Dilchert, 2012).

2.2. Green Port Policy

Several previous studies have shown that green or environmental policy can help to enhance and significantly influent employees' green behaviors (e.g. Chang and Wang, 2012; Norton et al., 2014; Ones and Dilchert, 2012). Green port policy refers to the extent to which a firm provides a clear mission statement, responsibilities and objectives in order to set standards of behaviors for employees, and establishes an environmental management system to enhance employees' green behaviors (Florida and Davison, 2001; Gupta et al., 2005; Lam and Notteboom, 2014). According to the theory of normative conduct (TNC) (Cialdini et al., 1990; Norton et al., 2015), development of a green or environmental policy demonstrates the port operator’s commitment to environmental protection, and formally expresses goals, principles, guidelines and strategies to follow with respect to green behavior in the workplace (Acciaro, 2014; Davarzani et al., 2015; Lam and Notteboom, 2014; Norton et al., 2014;). A port operator should provide a meaningful and clear statement of its green policy which reflects the organizational environmental management, including the goal of reduction of pollutants (e.g. air, wastes, and water) and meeting environmental objectives as required by the authorities. Written green policies and rules are the essential parts of organizational green climate. In the port area, for example,

the International Convention for the Prevention of Pollution from Ships (MARPOL), International Ship and Port Facility Security (ISPS) Code, and Sulphur Emission Control Areas (SECAs) are instructions that have been developed in order to provide international standards for environmental protection and safety (International Maritime Organization, 2015). While an organization's environmental management is developed, measured, assessed and reviewed, employees' green behaviors also change and they take actions to comply with the policies and regulations. An interrelationship will therefore develop between organizational green climate and employees' green behaviors. Thus, this study posited that:

H1: Green port policy is positively related to port employees' green behaviors.

2.3. Green Training

The success of environmental management of a company relies on proper training of its employees (Cantor et al., 2012; Daily and Huang, 2001). Based on the theory of normative conduct (Cialdini et al., 1990), green training is an essential mechanism for meeting the metrics of the port's green policy and environmental management because organizations depend on frontline employees' capabilities and skills to resolve problems and accomplish works, and to fulfill the obligations of environmental protection (The Port of Los Angeles, 2008; U.S. Environmental Protection Agency, 2007). According to the theory of planned behavior (TPB) (Ajzen, 1991), when employees' attitudes toward environment have improved, employees' green behaviors are likely to follow. Employees must undergo green training in order to ensure they can do the job correctly and actively engage an environment management program. When employees are well trained with respect to their environmental awareness and compliance with rules and procedures, their environmental performance improves (Daily and Huang, 2001). Cantor et al. (2012) suggested that the more environmental training was provided by the organization, the higher the perception of organizational support for environmental behaviors. To ensure the effectiveness of environmental management, organizations should develop a systematic, comprehensive green training program for employees. In addition, training can increase employees' commitment to achieve organization desired objectives (Cantor et al., 2012). The relevant studies on safety climate found that training exerts positive influences on employees' safety behaviors (Lu and Shang, 2005; Lu and Yang, 2011). Therefore, this research posited that:

H2: Green training is positively related to port employees' green behaviors.

2.4 Green Communication

Green communication is essential in the implementation of environmental management system (Sammalisto and Brorson, 2008). Providing environmental identification and information to employees through green communication and responding quickly to environmental problems are the

organization’s responsibilities. Port operators must provide and impart environmental management information to their employees to enable them to have a better understanding of the role of ports and their efforts towards green port. These information include data on port development, noise management, waste management, water quality and management, air quality and management, ship waste management, cargo handling, and hazardous cargo (European Sea Ports Organization, 2015). Communication refers to a series of formal and informal activities to ensure the bottom-up, top-down, and transverse flow of environmental information within an organization (Fernández-Muñiz et al., 2007; Sobnosky, 2001). Regular response on environmental issues can be communicated to employees through face-to-face meeting, telephone conversation, email, and social media such as WeChat, Line, Twitter, Facebook, etc. According the theories of social exchange (Cropanzano and Mitchell, 2005) and TPB (Ajzen, 1991), Chinander (2001) suggested firms that have better communication in this area will have better environmental performance. Lu and Yang (2011) also proposed that safety communication is positively associated with workers' safety behaviors. Accordingly, this study hypothesized that:

H3: Green communication is positively related to port employees' green behaviors.

2.5 Green Motivation

According to motivation theories (Deci and Ryan, 1987), a well motivation system can be helpful in motivating employees to implement environmental practices. Motivation can be a reinforcement tactics to continuously promote the employees' commitment to be environmentally responsible (Daily and Huang, 2001). Employees can be motivated to change their behavior to conform to a cultural norm if it is perceived that compliance will be more likely to lead to a desired performance. Green motivation reinforces employees' green behaviors, encourages employees' participation in environmental management meetings and setting green goals, and encourages employees to provide environmental suggestions that enhance environmental performance. Financial incentives (salaries, bonuses) and recognition awards (supervisors' praise, personal letters of commendation, publication of employees' outstanding reward, recognition in the company’s newsletter) have been used in the green motivation (Daily and Hung, 2001; Lu and Yang, 2011; Ramus and Killmer, 2007). Organizations which have established a system of rewards and motivation for green behavior should achieve a greater level of environmental performance (Graves et al., 2013; Hears-Saizarbitoria et al., 2011). Accordingly, this research hypothesized that:

H4: Green motivation is positively related to port employees' green behavior.

3. Methodology

3.1. Definition of population

Data for the research were collected from a questionnaire survey according to the study of Iacobucci

and Churchill (2010). The samples for this study was identified by the human resource department those who held the post of supervisor or above and participants who were involved in green port policy at the Port of Kaohsiung in Taiwan. The Port of Kaohsiung was ranked the 14th largest container port in the world in 2013 (UNCTAD, 2014), therefore, results from the survey can be generalized to other international ports. The questionnaire sought to obtain a profile of respondents by seeking information relating to their job position, work department, and years of working experience. A four-page questionnaire was sent to them on 20 September 2015. A follow-up mail was sent in October after the initial mail. The potential effective sample size was 180. The total number of usable completed questionnaire was 164. The overall response rate for this study was therefore 91.1%. The response rate was exceptionally high because the survey was supported by the Director and assisted by the human resources department of the Kaohsiung Port. In the sample of 164 port employees, 61% were supervisor or above, nearly 55% had worked in the port for five or more than five years, and 60% worked in operation and business department.

Although the response rate in this research was higher than 91%, it was necessary to conduct a non-response bias test as suggested by Armstrong and Overton (1977). Late survey participants were assumed to be treated similarly to non-respondents. The Chi-square statistics technique was used to examine differences in response to questionnaire items between the first and second mailing based on respondents' job title, years of working experience and work department. There were no statistically significant differences in response at the 0.05 level of significance. Survey findings could therefore be generalized to the target population.

3.2. Measures and construct development

Measurement items for assessing organizational green climate and green behavior were primarily adapted from previous research. In particular, in order to identify measures are relevant to the port organizations than general organization studied in the literature, a justification of measurement items was conducted based on the criteria of the certification of Eco Port which was issued by the European Sea Ports Organization (ESPO). When determining questionnaire items, it is crucial to ensure the validity of their content, since this is an important measure of a survey instrument’s accuracy. The questionnaire adopted in this study was confirmed through a review of the relevant literature, interviews and discussions with 10 port executives and experts who were directors, general managers, senior managers, and environmental supervisors in September, 2015. Based on the results of personal interviews, some modifications of the questionnaire were made: (1) one question of organizational green climate was re-phrased from “The environmental issues included in education program for new employees” to “My company provides sufficient green training of employees”; (2) the term of "green" was added in the question of “My company has set up a green work rule” in order to focus on the issue

of environment; (3) one item was eliminated is similar in meaning to the other organizational climate item (e.g. provision of green guidance is included by the item of green work rule); and (4) The question of the types of department was increased from four items to six items in order to identify respondents' work characteristics clearly.

Drawing on previous related studies, the four organizational green climate dimensions and green behavior dimension are conceptualized as latent constructs (Menor and Roth, 2007) (see Table 1). The items used to tap into each of the latent constructs of four organizational green climate and green behavior in the questionnaire was assessed by means of a five-point Likert scale from "1=strongly disagree" to "5=strongly agree." According to the studies of Wacker (2004) and Menor and Roth (2007), the conceptual definitions of these constructs of organizational green climate and employee green behavior and their associated items were purified using an iterative item-sorting analysis resulting in valid, reliable, and unidimensional sets of multi-item scales in the development stage. We used a confirmatory factor analysis to establish the reliability and validity of these constructs.

Since this study used one informant to answer the questionnaire in this research, potential Common Method Variance (CMV) was checked. Respondents were familiar with the measures because they had been in a relatively senior position bearing the responsibility of environmental management for more than five years. Most of the respondents were probably the most qualified people who could provide information about the issue of organizational green climate and green policy at port. Furthermore, Harman's one-factor test of common method variance was performed on the factors of organizational green climate dimensions and employee green behavior using exploratory factor analysis (Podsakoff et al., 2003). The results showed these factors with eigenvalues above 1.0, explaining more than 76% of total variance. For example, the first factor in green port policy explained 56.24% of the variance, which is acceptable to our study where constructs are correlated, both conceptually and empirically. Accordingly, it is reasonable to conclude that CMV bias does not appear to be a problem in this study.

Table 1 Prior research on measurement scales for organizational green climate and employees' green behavior

Constructs and measures	Prior study
Employees' Green Behavior	
I maintain green awareness at work	Norton et al. (2015); Ones and Dilchert (2012)
I comply with green rules and standard operational procedures of company	
I do not neglect green for convenience	
I actively participate in setting green goals	
I actively provide green improvement suggestions	
I actively participate in green port meeting	

Green Port Policy	
My company has written green port policies.	Videras and Alberini (2000); Shang et al. (2010); Lu et al. (2012); Zhu et al. (2007); Chang and Wang (2012); Lam and Notteboom (2014)
My company has established green port policy objectives.	
My company has established a green responsibility system (preventative and corrective action).	
My company has set up a green work rule.	
My company has concerned sustainable development and corporate social responsibility in green port policy.	
My company has audit conducted according to ISO 14001.	
My company has implemented Eco Port certification.	
Green Training	
My company provides education training of green port.	Fonseca and Jabbour (2012); Searcy and Gershon (2000); Cantor et.al. (2012); Milliman (2013)
My company education programme includes green port policy.	
My company's green port training apply to my job.	
My company's green port training is understanding.	
The design of green training programs in my company is good.	
My company provides sufficient green training of employees.	
Green Communication	
My company provides workers with green related information.	Fernández-Muñiz et al. (2007); Johnson (2012); Johnson and Miller (2012); Sammalisto and Brorson (2008); Milliman (2013)
My company advocates green port policies to relevant stakeholders (oral/ electronic media/press).	
My company's website deliveries the information of green port policies publicly.	
My company organizes the conference of green port.	
My company publishes green port policy brochures.	
My company advocates green port policy for local communities.	
My company has green communication procedures with government departments, NGOs, local communities, social media and other interested party.	
Green Motivation	
My company encourages workers' participation in green decision-marking.	Neal and Griffin (2006); Milliman (2013); Lülfs and Hahn (2013); Ramus and Killmer (2007)
My company motivates workers' green behaviors.	
My company encourages workers provide green suggestions.	
My company rewards green workers.	

3.3. *Data Analysis*

We used descriptive statistics, exploratory factor analysis and item total correlation analysis to summarize the large number of organizational green climate attributes and group them into smaller manageable sets of underlying factors or dimensions. Confirmatory factor analysis and the structural equation modeling approach were used to examine the unidimensionality, convergent validity, discriminant validity, and construct reliability of organizational green climate and green behavior. In addition, one-way analysis of variance analysis (ANOVA) was used to evaluate the relationship between organizational green climate, green and respondents' characteristics (i.e., job position). Furthermore, a structural equation modeling was used to examine the effects of the organizational green climate dimensions, that is, green port policy, green motivation, green communication, and green training, on green behavior. All analyses were carried out using IBM SPSS 20.0 statistics with AMOS

software.

4. Results of Analyses

4.1. Exploratory Factor Analyses

It is submitted that organizational green climate measures are firstly proposed by this study. Therefore, an exploratory factor analysis was used to identify the 24 organizational green climate attributes to a smaller, manageable set of underlying factors. The ratio of sample size (164 respondents) to numbers of items was 6.8. It exceeded the minimum which was to have at least five times as many observations or items as there were variables to be analyzed (Hair et al., 2010). The data were deemed appropriated for analysis, based on the Kaiser-Meyer-Olkin sampling adequacy value of 0.944 (Hair et al., 2010). The Bartlett Test of Sphericity was significant (χ^2=3576, p<0.01), and well above the recommended level. To aid interpretation, eigenvalues greater than one and factor loading value above 0.5 were adopted to determine the number of factors (Hair et al., 2010). Only one item, "my company provides workers with green related information (Ad1)", its factor loading value was less than 0.5. Thus, this item was not considered in the following analyses. As shown in Table 2, four factors were found to underlie the organizational green climate based on survey responses. They are labeled and described below:

(1) Factor 1, a green port policy dimension, consisted of seven items, namely, 'my company has written green port policies", "my company has established green port policy objectives", "my company has established a green responsibility system (preventative and corrective action)", "my company has set up a green port work rule", "my company has considered sustainable development and corporate social responsibility for a green port policy", "my company has conducted assessment of green port according to ISO 14001", and "my company has implemented Eco Port certification". Factor 1 accounted for 56.24% of the total variance. "My company has considered sustainable development and corporate social responsibility for a green port policy" had the highest factor loading on this dimension.

Table 2 Results of explanatory factor analysis of organizational green climate attributes

	Item	GP	GT	GC	GM
Aa1	My company has written green port policies.	0.732	0.287	0.184	0.182
Aa2	My company has established green port policy objectives.	0.775	0.161	0.237	0.074
Aa3	My company has established a green responsibility system (preventative and corrective action).	0.725	0.259	0.127	0.287
Aa4	My company has set up a green work rule.	0.674	0.402	0.146	0.280
Aa5	My company concerns about sustainable development and corporate social responsibility in green port policy.	0.806	0.146	0.316	0.065
Aa6	My company has conducted assessment of green port according to ISO 14001.	0.664	0.328	0.142	0.241
Aa7	My company has implemented Eco Port certification.	0.772	0.216	0.299	0.092
Ab1	My company provides education training of green port.	0.435	0.714	0.203	0.229
Ab2	My company's education training includes green port policy.	0.403	0.748	0.246	0.110

Ab3	My company's green port training apply to my job.	0.351	0.697	0.301	0.266
Ab4	My company's green port training is understanding.	0.337	0.718	0.277	0.320
Ab5	The design of green training programs in my company is good.	0.233	0.777	0.302	0.344
Ab6	My company provides sufficient green training of employees.	0.204	0.785	0.283	0.325
Af1	My company encourages workers' participation in green decision-marking.	0.244	0.247	0.239	0.843
Af2	My company motivates workers' green behaviors.	0.215	0.341	0.282	0.791
Af3	My company encourages workers provide green suggestions.	0.152	0.269	0.312	0.822
Af4	My company rewards green workers.	0.201	0.243	0.372	0.737
Ad2	My company advocates green port policies to relevant stakeholders (oral/ electronic media/press).	0.197	0.271	0.762	0.253
Ad3	My company's website deliveries the information of green port policies publicly.	0.292	0.220	0.769	0.256
Ad4	My company organizes the conference of green port.	0.356	0.126	0.753	0.127
Ad5	My company publishes green port policy brochures.	0.229	0.199	0.761	0.225
Ad6	My company advocates green port policy for local communities.	0.094	0.336	0.711	0.323
Ad7	My company has communicated with government departments, NGOs, local communities, social media and other interested parties.	0.277	0.307	0.627	0.314
	Percentage of variance	56.24	9.060	6.500	4.700
	Cronbach's α	0.923	0.950	0.921	0.942

Note: GP: green port policy; GT: green training; GC: green communication; GM: green motivation

(2) Factor 2, a green training dimension, comprised six items, namely, "my company provides green port education training", "my company's education training includes green port policy", "my company's green port training applies to my job", "my company's green port training is understandable, the design of green training programs is effective", and "my company provides sufficient green training to employees". "My company provides sufficient green training to employees" had the highest factor loading on this dimension. Factor 2 accounted for 9.06% of the total variance.

(3) Factor 3, a green communication dimension, consisted of six items: "my company advocates green port policies to relevant stakeholders (oral/electronic media/press)", "my company's website deliveries green port policies and disclosed information publicly", "my company organizes a conference of green ports, my company publishes green port policy brochures", "my company advocates green port policy for local communities", and "my company has communicated with government departments, NGOs, local communities, social media and other interested parties". "My company's website deliveries green port policies and disclosed information publicly" had the highest facto loading on this dimension. Factor 3 accounted for 6.50% of the total variance.

(4) Factor 4, a green motivation dimension, comprised four items: "my company encourages workers' participation in green decision-making", "my company motivates workers' green behavior", "my company encourages workers to provide green suggestions", and "my company rewards green workers". Factor 4 accounted for 4.70% of the total variance, slightly less than factor 3.

A reliability test was conducted according to the Cronbach's alpha values to measure the consistency

and reliability of these dimensions. The Cronbach's alpha values of the dimensions are listed in Table 2. The reliability coefficient of each variable was greater than 0.90, indicating sufficient internal consistency (Iacobucci and Churchill, 2010).

4.2 Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted to verify the four constructs in the measurement model, namely: green port policy, green training, green motivation, and green communication. CFA was used to test convergent validity, item reliability, unidimensionality, and divergent validity of the scales employed in this research. Unidimensionality refers the existence of one latent variable underlying a set of items. One of the loadings in each construct or latent variable can be set to a fixed value of 1.0 for the comparison with other constructs (Koufteros, 1999). The path diagram presented in Figure 1 shows a measurement model where the four latent constructs (green port policy, green training, green motivation, and green communication) consist of their corresponding multiple items or measures. Twenty-three observed variables were enclosed in squares. Seven observed variables (Aa1-Aa7) were loaded onto green port policy; six observed variables (Ab1-Ab6) were loaded onto green training; four observed variables (Af1-Af4) were loaded onto green motivation; and seven observed variables (Ad2-Ad7) were loaded onto green communication.

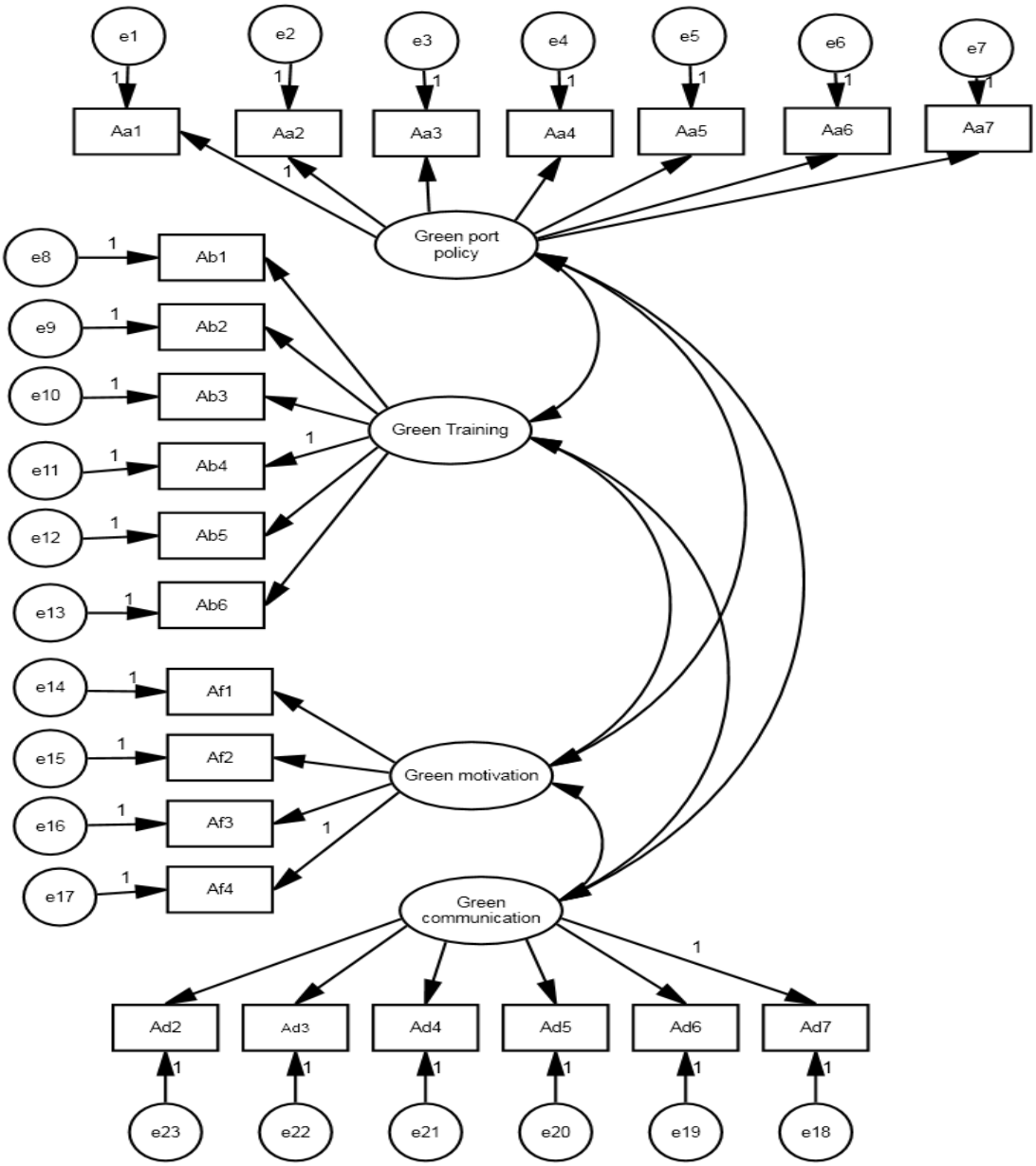

Figure 1. Path diagram representing initial model

Note: e1-e23 are error indicators.

4.3 Standardized Residuals and Modification Indices

The model was modified by examining the standardized residuals and the modification indices. Using the AMOS program to indicate the differences between the observed correlation/covariance and the estimated correlation/covariance matrix. Hair et al. (2010) suggested that standardized residuals with value greater than 2.58 or less than -2.58 were considered statistically at the 0.05 significance level. The standardized residual values of the items Aa2, Aa4, Ab1, Ab2, and Ad1 exceeded 2.58 in absolute terms. Therefore, these items were not included in the revised model. Several criteria were used to evaluate the fit and unidimensionality of the measurement model, namely: goodness-of-fit (GFI), comparative fit index (CFI), root-mean-square-error of approximation (RMSEA), and root mean square residual (RMSR). The normed Chi-square (χ^2/df) value was 1.86, and the GFI and CFI value were 0.837 and 0.954, respectively, which exceeded the recommended level of 0.8. The RMSR and RMSEA value were 0.033 and 0.073, which were below their respective recommended threshold level of 0.05 and 0.08. As shown in Table 3, all item loadings were significant. Therefore, the final model yielded an acceptable fit level.

4.4 Convergent Validity and Item Reliability

Convergent validity was assessed to examine the loadings and their statistical significance on each construct through t-values. The t-values are the critical ratio (CR), which represents the parameter estimate divided by its standard error. Table 3 indicated the t-values for each factor were greater than 1.96 implies statistical significance at the 0.05 level (Byrne, 2001). This provides satisfactory evidence of the convergent validity and unidimensionality of each factor (Anderson and Gerbing, 1998). Item reliability (R^2) can be used to measure the reliability of a particular observed variable or item (Koufteros, 1999). Results revealed that all R^2 values were greater than 0.5, providing evidence of convergent validity (Bollen, 1989).

4.5 Discriminant Analysis

Assuming an adequate model fit, further the test of discriminant validity was performed (Koufteros, 1999). The first model was analyzed with the correlation between the latent variables fixed at 1.0, and the second model was based on the correlation between the latent variable free to assume any value. The difference in the Chi-square value between these two models is significant, suggesting the evidence of discriminant validity. Table 4 presents that the difference in χ^2 for the fixed and free solutions was highly significant (i.e. the minimum χ^2 difference = 31.33, $p<0.01$, degree of freedom = 1). This reflected the evidence of discriminant validity.

Table 3 Parameter estimate, standard errors, critical ratio, and R^2.

Factors and scale items	Unstandardized factor loading	Completely standardized factor loading	Standard error[a] (S.E.)	Critical ratio[b] (C.R.)	R^2
Green port policy					
Aa1	1.000	0.755	_	_	0.571
Aa3	0.934	0.748	0.095	9.835	0.560
Aa5	1.049	0.874	0.095	11.063	0.765
Aa6	0.903	0.736	0.094	9.638	0.542
Aa7	1.015	0.863	0.093	10.880	0.745
Green training					
Ab3	0.938	0.847	0.059	15.959	0.718
Ab4	0.949	0.891	0.053	18.025	0.794
Ab5	0.989	0.933	0.047	20.880	0.870
Ab6	1.000	0.915	_	_	0.837
Green communication					
Ad2	0.989	0.846	0.083	11.918	0.715
Ad3	1.106	0.867	0.090	12.324	0.752
Ad4	0.908	0.766	0.086	10.541	0.588
Ad5	1.032	0.811	0.091	11.375	0.658
Ad6	1.032	0.804	0.090	11.469	0.646
Ad7	1.000	0.787	_	_	0.619
Green motivation					
Af1	0.985	0.914	0.063	15.583	0.836
Af2	1.067	0.921	0.068	15.631	0.849
Af3	1.006	0.917	0.064	15.774	0.841
Af4	1.000	0.838	_	_	0.702

a. S.E. is an estimation of the standard error of the covariance.
b. C.R. is the critical ratio obtained by dividing the estimate of the covariance by its standard error. A value exceeding 1.96 represents a level of significance of 0.05.
c. Indicates a parameter fixed at 1.0 in the original solution.

Table 4 Assessment of discriminant validity

Pair of Constructs	Pair of Constructs		
	χ^2(d.f.)		χ^2 *difference*(d.f.)
Green port policy vs. Green training	138.55 (27)	86.93 (26)	51.62 (1) ***
Green port policy vs. Green motivation	139.29 (27)	79.86 (26)	59.43 (1) ***
Green port policy vs. Green communication	117.66 (43)	179.05 (44)	61.39 (1) ***
Green training vs. Green motivation	22.58 (19)	53.91 (20)	31.33 (1) ***
Green training vs. Green communication	66.28 (34)	107.21 (35)	41.01 (1) ***
Green motivation vs. Green communication	69.46 (34)	108.83 (35)	39.37 (1) ***

Note: ***$p<0.01$

4.6 Composite Reliability and Variance Extracted Measures

Composite reliability provides a measure of the internal consistency and homogeneity of the items comprising a scale (Iacobucci and Churchill, 2010). Highly reliable constructs are those in which the indicators are highly inter-correlated, indicating they are all measuring the same latent construct. The range of values for reliability is between 0 and 1. The composite reliability value of green port policy, green training, green communication, and green motivation were 0.897, 0.943, 0.922 and 0.943, respectively. All values exceeded the recommended level of 0.70 (Hair et al., 2010). The variance extracted value is a complementary measure for the construct reliability value (Koufteros,1999). High variance extracted values occur when the indicators are truly representative of the latent construct. Results presented in Table 5 indicate that green port policy had the lowest variance extracted value of 0.636, indicating that 63.6% of the variance in the specified indicators was accounted for by this construct.

Table 5 Composite reliability and average variance extracted values

Dimension	Composite reliability[a]	Average variance extracted[b]
Green port policy	0.897	0.636
Green training	0.943	0.805
Green communication	0.922	0.663
Green motivation	0.943	0.807
Green behavior	0.920	0.660

a. Composite reliability = (sum of standardized loadings)^2/[(sum of standardized loadings) ^{2}+(sum of indicator measurement error)]. Indicator measurement error can be calculated as 1-(standardized loading)^2.
b. Average variance extracted (AVE) = (sum of squared standardized loadings)/[(sum of squared standardized loadings)+(sum of indicator measurement error)]. Indicator measurement error can be calculated as 1-(standardized loading)^2.

4.7 Level of analysis

Table 6 shows the means, standard deviations (SD), and correlations of the constructs measured in the study. As can be seen, a positive relationship between organizational green climate dimensions and employees' green behaviors. Results indicated that respondents had their highest mean scores on green port policy (mean = 4.01), followed by green behavior (mean = 3.82), green communication (mean = 3.63), green training (mean = 3.53), and green motivation (mean = 3.35). As seen in Table 7, respondents were categorized into four groups, namely: senior manager or above, manager/assistant manager, supervisor, and general employees. Agreement level with green training, green motivation and green behavior dimensions significantly differed between these four groups at the $p < 0.05$ significance level. The agreement with these dimensions from the senior manager or above tended to be higher than manager/assistant manager, supervisor, and general employee groups on green training and green behavior.

Table 6 Descriptive statistics and inter-correlations among constructs

Item	Mean	SD	Green policy	Green training	Green communication	Green motivation	Green behavior
Green port policy	4.01	0.60	1				
Green training	3.53	0.74	0.717***	1			
Green communication	3.63	0.70	0.623***	0.683***	1		
Green motivation	3.35	0.79	0.549***	0.688***	0.679***	1	
Green behavior	3.82	0.67	0.607***	0.670***	0.656***	0.657***	1

***Significant level at $p < 0.01$

Table 7 Comparison of differences in respondents' perceptions of organizational green climate and green behavior based on job title

Organizational green climate Dimensions	Job title: Senior manager or above (16)		Manager/ Assistant manager (20)		Supervisor (64)		General employee (64)		F ratio
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Green port policy	4.21	0.47	4.09	0.62	3.87	0.56	4.09	0.66	2.187
Green training	3.81	0.49	3.53	0.75	3.33	0.71	3.68	0.78	3.342*
Green communication	3.87	0.66	3.53	0.64	3.50	0.62	3.73	0.79	1.874
Green motivation	3.50	0.48	3.49	0.77	3.13	0.77	3.51	0.87	2.850*
Green behavior	4.10	0.67	3.89	0.60	3.62	0.58	3.92	0.74	3.462*

Note: The mean scores were based on a five-point scale (1= very unimportant, to 5= very important); SD= standard deviation; *Significant level $p < 0.05$.

4.8 Results of Hypotheses Testing

After confirming the fit of the measurement model, we examined the proposed structural equation model and tested the hypothesized relationships. Figure 2 shows that the data adequately supported the estimated model. The Chi-square (χ^2) value was 474.40 at 265 degrees of freedom, and was statistically significant at $p<0.01$, below the minimum level of 0.05. This was not surprising because the Chi-square value is sensitive to sample size (Bentler and Bonnet, 1980; Shah and Goldstein, 2006), which has been discussed in the studies of Hu and Bentler (1998) and Koufteros (1999). The results show a value of 1.79 in the Chi-square to degree of freedom ratio, which is satisfactory with respect to the commonly recommended value of less than 2.0. Moreover, the results of fitting the structural model to the data revealed that the model had a good fit as indicated by the comparative fit index (CFI=0.943), normed fit index (NFI= 0.881), root mean square residual (RMR= 0.032) and root-mean-square error of approximation (RMSEA =0.07).

Table 8 Results of the structural equation modeling

Variables	Estimate	S. E.[a]	C.R.[b]
Green port policy → Green behavior	0.189[c]	0.080	2.262
Green training → Green behavior	0.149	0.074	2.002
Green motivation → Green behavior	0.195	0.069	2.846
Green communication → Green behavior	0.175	0.084	2.099

a. S.E. is an estimate of the standard error of the covariance
b. C.R. is the critical ratio obtained by dividing the covariance estimate by its standard error
c. Underlined values are critical ratios exceeding 1.96, at the 0.05 level of significance.
Fit indices: $\chi^2 = 474.40$ ($p < 0.01$), df = 48, $\chi^2/df = 1.790$, CFI = 0.943, NFI = 0.881, RMR=0.032, RMSEA = 0.070.

As summarized in Table 7, all hypothesized relationships were significant and in the expected direction. As shown in Figure 2, the significant relationships between organizational green climate dimensions and green behavior were supported by the critical ratio (CR). The CR is a t-value obtained by dividing the estimate of the covariance by its standard error. A value of CR greater than 1.96 means a level of significance of 0.05. Green port policy was found to have a significant relationship with employees' green behaviors (estimate = 0.189, C.R. = 2.26), and green training was significantly associated with employees' green behaviors (estimate = 0.149, C.R. = 2.00). Thus, hypotheses H1 and H2 were supported. The results indicate that a significant relationship between green communication and employees' green behavior (estimate = 0.175, C.R. = 2.09). Hypothesis H3 was therefore supported. The results also showed that green motivation had a positive influence on employees' green behavior (estimate = 0.195, C.R. = 2.84). Based on the value of estimate, green motivation was the most important determinant of employees' green behavior, followed by green port policy, green communication, and green training. In addition, the covariance results of indicated a positive correlation between green port policy, green training, green communication, and green motivation in the model (see Figure 2). This result was consistent with the results of correlation analysis in the previous section.

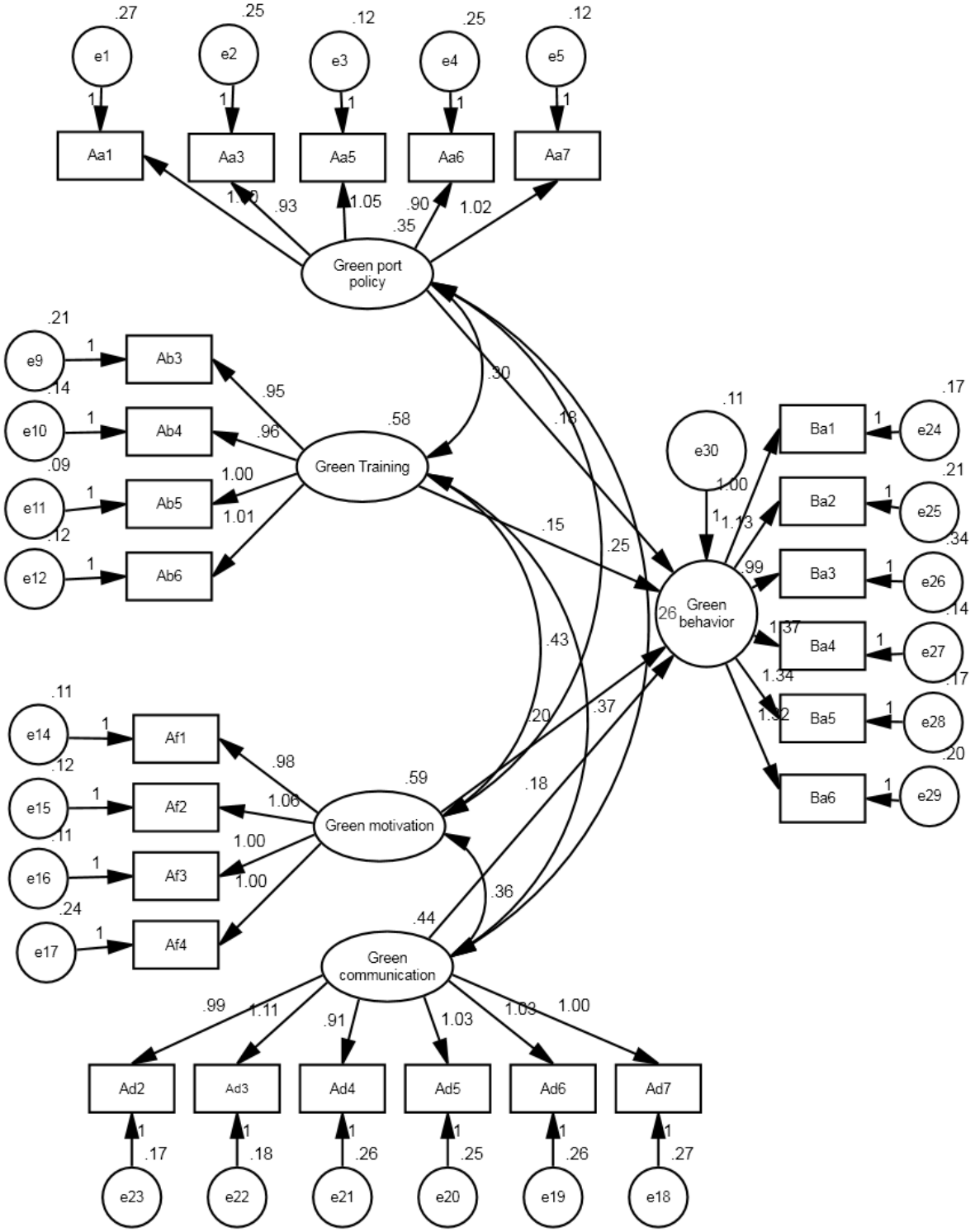

Figure 2 The structural equation modeling result

Note:

Ba1: I maintain green awareness at work

Ba2: I comply with green rules and standard operational procedures of company

Ba3: I do not neglect green for convenience

Ba4: I actively participate in setting green goals

Ba5: I actively provide green improvement suggestions

Ba6: I actively participate in green port meeting

5. Discussions and Conclusions

The focusing on environmental management as an important issue at ports has long been recognized in previous studies (Acciaro, 2014; Chang and Wang, 2012; Davarzani et al., 2015; Gupta et al., 2005; Lam and Notteboom, 2014). It is increasingly being recognized that organizational climate plays an important role in establishing the kind of organizational green climate which can encourage employees to be motivated to behave in an environmental way (Norton et al., 2014; Norton et al., 2015). The port operation is one of major pollutants. Although port operators attempt to protect environment, they are not completely successful in eliminating pollutants. We examined the importance of organizational green climate to explain employees' green behaviors in the port context and empirically evaluated organizational green climate dimensions. We answered several important questions with regard to organizational green climate and green behavior in this context, namely, how to identify the constructs and measures of organizational green climate and green behavior, what are employees' perceptions of organizational green climate in the port context and do their perceptions of organizational green climate dimensions influence employees' green behaviors? However, to research on the importance of organizational green climate in explaining employees' green behaviors in the port context has been minimal. This study therefore attempts to identify organizational green climate for enhancing environmental management and examines its influence on employees' green behaviors. The primary findings of this study based on a questionnaire survey conducted at the Port of Kaohsiung in Taiwan are summarized below.

First, exploratory factor analysis and confirmatory factor analysis were conducted in order to reduce the organizational green climate attributes into critical dimensions. Four dimensions were identified: green port policy, green training, green communication, and green motivation. Second, green motivation considered as the most important by respondents, followed by green port policy, green communication, and green training. Thus, port operators need to be especially aware of the importance of these organizational green climate dimensions in port operators when developing their green port operations and policy. Third, results presented in Table 7 show that the level of agreement attached to green training and green motivation dimensions significantly differed among the four jot title groups at the 5% significance level. Finally, our results indicate that the hypotheses of a positive relationship between organizational green climate and employees' green behaviors were supported.

Our research contributes to the emerging but understudied topic of organizational green climate in the shipping and transport logistics literature in several ways. First, to our knowledge, this is the first research to rigorously scrutinize the dimensions of organizational green climate at port. Our findings contribute to the literature by highlighting the importance of previously neglected environmental mechanisms underlying the association between organizational green climate and behavior. Second,

while extant research has yielded different determinants of environmental management, our empirical results indicate that each of the organizational green climate dimensions - green policy, green training, green motivation, and green communication – is essential for enhancing employees' green behaviors. To the extent that these results are generalizable to other sectors (e.g. shipping companies, airlines, and manufacturers), they reinforce the criticality of an organizational green climate in environmental management. Third, we find that organizational climate and the theory of normative conduct are useful in understanding organizational green climate and employees' green behaviors, because our findings support the logic for managing interrelated organizational green climate and behavior. This logic is in line with the studies of Norton et al. (2014) and Norton et al. (2015). Forth, this study contributes to the environmental management literature by examining organizational green climate with employees' green behaviors. The environmental management literature focuses strongly on the plan, implementation, measurement, and evaluation at ports, giving less attention to how organization can build green climate influence on employees' green behaviors. This research proposes the constructs and measures of organizational green climate and empirically examines its influence on employees' green behaviors. The measures of organisational green climate and findings of this research can be generalised to other ports. Finally, our findings provide insights into how organizational green climate can be developed. This research has found green motivation and green port policy to be important while rewards, encouragement, and clear green policy and rule should be provided to employees to strengthen their green behaviors. As a result, port operators and policy makers can use the results of this study in their environmental assessment to develop organizational green climate such as environmental regulations and operating procedures. Improved green policy implementation should help to prevent damage or injury to both cargo and people arising from environmental disasters. The results of this study could also enhance port operators' green attitude and thereby prevent future pollutants and reduce risk in port operations.

5.1 Implications of the Study Findings

Several implications can be drawn from the key findings of this study. First, organizational green climate is an important factor influencing green behavior in port operations that must be taken into consideration by port operators. Each dimension of organizational green climate seems to be related to a different degree to employees' green behaviors in port operations. By understanding the differences between organizational green climate dimensions, port managers and officers can develop effective action plans to enhance green behavior or environmental management in port operations.

Second, with respect to organizational green climate dimensions, respondents from senior manager or above had highest mean scores on green port policy, green training and communication, whereas respondents from general employees had highest mean scores on green motivation. These findings are not surprising because senior managers are likely to place greater emphasis on management policies, goals, education and training to stress employees' green behaviors. Accordingly, some green

management can be suggested to improve green environment at port, including implementation of Eco Port certification, corporate social responsibility, to clear write green port policy.

Third, the study's findings indicate that organizational green climate dimensions are positively associated with employees' green behavior such as green compliance and participation. Such findings suggest that greater organizational green climate will lead to good green behavior and further enhance environmental protection. They are consistent with findings proposed in the studies of Norton et al. (2014) and Norton et al. (2015). Additionally, the results indicate a significant correlation between green port policy, green training, green motivation, and green communication, implying that the achievement of an effective environmental management requires a combination of these organizational green climate dimensions.

5.2 Limitations and Future Research

Where there is a valuable study in the organizational green climate field, it does, however, have several limitations for future research. First, the data collected on employees' green behaviors and perceptions of organizational green climate in port operations may have been subject to bias in terms of employees' willingness to report and respond. Employees may have been reluctant to report green behavior because of potential individual repercussions and concerns in avoiding lawsuits against the organization. Hence, further researches could measure employees' green behaviors by actual observational method. Second, this study was limited to four organizational green climate dimensions according to the studies of Lu et al. (2012), Lülfs and Hahn (2013), Milliman (2013), Neal and Griffin (2006), Ramus and Killmer (2007), Videras and Alberini (2000), and Zhu et al. (2007). Although these four dimensions are important and by themselves explain green behavior, organizational green climate is a complex construct. Future studies should seek to consider other variables, such as supervisor's leadership style (Bass and Avolio, 1990) and external pressure (e.g. International Maritime Organization). For example, transformational leadership characterized by value based and personal interaction, is positively related employee performance and behavior (Barling et al., 2002). These factors may have an influence on the four organizational green climate dimensions examined in the present study, and may provide further insight on the results discussed above. Third, future researches should seek to explain how the organizational green climate dimensions influence environmental performance outcomes, such as air or water pollutions. The findings of this study only reflect the situation regarding environment at a specific moment in time. Fourth, this study was only focused on Eco Port of Kaohsiung, the distinction of green climate and green behavior between Eco Port and non-Eco Port, can be examined in the future research. Future studies may be conducted using the longitudinal approach to investigate the short-and long-term effects of organizational green climate and employees' green behaviors in port operations. In this research, there were only 164 samples, and the respondents of the questionnaire survey were limited to port employees. Green port policies affect stakeholders in surrounding communities. Therefore, it is recommended that samples in adjacent

communities be added to better determine the overall effectiveness of the green port policy.

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