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Survey Validation for The Impact of Environmental Management Systems on Green Innovation

Kalaivani Jayaraman [1,2], Magiswary Dorasamy [2, *], Chinnasamy Agamudai Nambi Malarvizhi[2]

[1] Faculty of International Business, University Tunku Abdul Rahman, Kajang, Selangor, 43000, Malaysia

[2] Faculty of Management, Multimedia University, 63100 Cyberjaya, Selangor, Malaysia

magiswary.dorasamy@mmu.edu.my

Abstract. As people's awareness of environmental issues and the acceptance of green innovations have grown over the past few decades, Environmental Management System (EMS) research have expanded and changed. According to the literature, EMS deployment can improve organizational performance. Given that heavy industrialisation has reduced its detrimental environmental consequences, green innovation is viewed as a important tool for greening the economy. One of the most crucial phases of a research effort is the pilot study. Pre-test and pilot tests will be used to assess and improve the research instrument. These acts demonstrate that the research instrument being used is reliable. Since questionnaire taken from earlier research, a pre-test was conducted with academic and industry experts to provide their professional judgements on its adequacies. Before delivering the questionnaire to the final responders, a group of about 10 specialists help to improve its phrasing, linguistic clarity, and scale fit. A pilot study is akin to a test run to make sure full research is being conducted effectively. A pilot study is used to evaluate the questionnaire's advantages and disadvantages. Following the completion of the survey, which included about 30 respondents, the validity and reliability were checked. The reliability data showed that most of the pre-designed scales and measures produced outcomes that were more favorable than the minimal cut-off point. Due to the internal consistency of all the items, they may all be used for the official survey exercise.

Keywords: Environmental Management System, Organisational Performance, Green Innovation, Pre-test, Pilot test

1. Introduction

The global environment has become a concern due to vast development in the economy and this creates great challenges to government regulatory bodies, industries, and society to find a solution immediately. Environmental protection or sustainable development were presumed not important for businesses that generated only profits for years. This global warming disaster points fingers at the industry for its cause of this issue (Rohati et al., 2016). Furthermore, since the pre-industrial era, the extreme increase in greenhouse gas (GHG) emissions has had a strong impact on nature and the whole human system.

A rising number of businesses discharge toxins into the environment, causing the process of deterioration to continue. This attitude is driven by constant consumption and creates major environmental risks. This further contributes to global warming and the depletion of the ozone layer (Neves, Salgado, & Beijo, 2017). Industry or individual companies in the business of sourcing, manufacturing, and logistics in developing countries generate climate change and other environmental issues (Mayel, 2018). In the early 80's, environmental regulations were introduced so that the companies work to comply with the regulation (Berry & Rondinelli, 1998; Siva et, al.,2016). In the late 80s and early 90's companies were less driven by compliance; however, the attention was paved to internal strategy, due to an increase in environmental by stakeholders (Lent & Wells, 1992; Siva et al., 2016).

In the current economic climate, it is more difficult than ever for businesses to succeed, and they must be able to manage significant changes to survive in the market (Dorin Maier et al., 2015). Due to the intense market rivalry and rising client demand, managers encounter challenges (Dorin Maier et al., 2015). Innovation is one method of resolving these problems.

The Environmental Management System was created to overlook the companies' laws, rules, and directions in operations and requires every company to embrace it. The purpose is to improve environmental performance effectively and efficiently in using its resources and at the same time reduce its wastage, improve its competitive advantage, and most importantly gain stakeholders' trust (Khan & Johl, 2019). Research on the Environmental Management System is still underdeveloped, especially in countries in emerging economies (Boiral, 2018).

1.1. Problem Statement and Research Objective

Based on the literature review, there are various threats and issues when comes to Malaysian manufacturing industries and it needs precautionary measures to overcome them. Recent climate changes have brought in more challenges to governments in the world (Gerstlberger, Praest Knudsen, & Stampe, 2014). According to the Climate Risk Country Profile published by the World Bank Group and the Asian Development Bank, Malaysia is already experiencing the greatest effects of climate change, with average temperatures there anticipated to climb by 3.11 degrees Celsius by the 2090s (NST, 2023). Rationally speaking, the higher the economic growth the greater the damage to the environment (Shahbaz et al., 2018) this is because once the enterprise starts focusing on environment management, they will face a reduction in profit. According to Environment Index Performance (EPI, 2022), Malaysia in 130th ranking in 2022 compared to 2018 where Malaysia's EPI ranking was at 75th place. Additionally, the usage of energy in the past few years has increased in Malaysia (Global Sustainability Index, 2020). These warning signs seriously indicate that Malaysian Manufacturing industries need to take measures to rectify ways to overcome environmental degradation.

Hence, the Malaysian government has embraced Sustainable Development Goals (SDG) with highlights on the need to preserve the environment and initiate green growth. However, recently the focus has been shifted to enterprises, where studies on environmental management were absorbed to incorporate sustainable development and economic performance. The 12th Malaysian Plan (2021-2025) strengthens the platform for greener growth and policy shifts. Many businesses have been forced to absorb management tools to produce better quality goods and processes while safeguarding the

environment and the welfare of their workers because of economic globalization and increased competition (Simon et al., 2014; Nunhes, Barbosa & Oliveira, 2017). Companies have adopted a variety of standards to help accomplish organizational goals (Sampaio & Neves, 2012; Nunhes et al., 2017).

As environmental and sustainable innovation becomes a global concern, it has further drawn the attention of various stakeholders including industrialists, academics, local government, and other interested parties. Researchers have suggested that green innovation is one way to handle environmental challenges while fostering long-term innovation. World Bank (2022) mentioned that the emission rates, waste, contamination of water, climate changes, and biodiversity loss continue and as a result, it is not only affecting the environment but also society at large.

Numerous studies have been harshly criticized for their inability to give a better knowledge of the issue and for producing results that are inconsistent with one another (Boiral, 2018; Boiral & Henri 2012; Heras-Saizarbitoria & Boiral 2013; Heras-Saizarbitoria et al, 2011a).

In-depth green innovation experimentation is presently being conducted by organisations (Chen et al., 2018; Cai & Zhou, 2014; Cainelli et al., 2015; Przychodzen & Przychodzen, 2018). However, very few studies have looked at the connection between environmental innovations and environmental management systems (EMS). Research is still in its infancy, especially in affluent nations, and is frequently disregarded in developing nations (Boiral, 2018). According to several studies, there is still a lack of proper research following the amendment to ISO14001-2015, which makes it difficult to understand the relationship between environmental management systems and green innovation (Ololade & Rametse, 2018; Salim, Padfield, Hansen, Mohamad & Yuzir, 2018).

The inconsistent results highlight the need for more research into how EMS affects organizational success. The findings of this study support the Malaysian government's position on green growth. As a result, study questionnaires were created using the tools from earlier studies. A collection of validated instruments is required to achieve the study's aims, which are to evaluate the link between the environmental management system, green innovation, and organizational performance.

2. Literature Review

2.1. Relationship between Environmental Management Systems and Organizational Performance

The International Organisation for Standardisation (ISO) was established in 1996 because of the Earth Summit in Rio de Janeiro in 1992, which also prompted the establishment of an environmental management system (EMS) and sustainability (Salim et al., 2018). EMS family standards were established to help organizations to accelerate the process of linking to ecological process through the initiation use of resources efficiently and at the same time overcome environmental impact (Romero, Baldassarre, Rodriquez & Piattini, 2019). From 1973 to 2004, many improvements were made to the EMS to meet environmental concerns and to improve the system. In 2015, a new amendment was developed that emphasizes leadership and their involvement in addressing environmental issues. EMS was designed to create a collection of business rules, regulations, and guidelines that would be followed during operations. Almost every firm in the world has adopted EMS. The fundamental goal of an EMS is to improve a company's environmental performance by implementing strategies that reduce waste, provide businesses with a competitive edge, and win over stakeholders' confidence. An overview of the family series of ISO 14000 is given in Tables 1 and 2.

According to Li et al. (2014), the performance of an organization refers to an organization's actual output based on its planned results, goals, and objectives. This helps the organization maintain a competitive edge. Organizational performance effects of corporate sustainability have been studied comprehensively in previous studies (Maletic et al., 2016). Some empirical research (Maletic et al., 2016) has investigated the relationship between the theory that corporate sustainability is a form of

sustainable innovation (Lopez-Valeiras et al., 2015) and the relationship between practices for sustainable-oriented innovation and organizational performance based on contextual and institutional factors. A crucial component of being competitive in the global market is green manufacturing. As a result, using green implementation techniques can improve organizational performance and profitability (Roy & Khastagir, 2016; Rehman et al., 2016).

There are a few factors in EMS that determine the performance of an organization. A leader's commitment is essential in bringing a better condition to an organization. A good leader can lead to better performance of their organization through employee support. Leaders are strongly associated with their contribution to organizational performance. Other than the leader's commitment, changes in technical aspects in terms of processes so that organizational performance can be enhanced. The presence of technologies for cleaner production is believed to positively impact organizational performance (Dubey, Gunasekaran &Ali, 2014). A well-integrated information management system (IMS) helps to enhance an organization's ability to perform (Masuin, Latief & Zagloel, 2019). A systematically well-planned application may help to achieve environmental goals and at the same time maintain organizational performance. Human resource management is another factor that plays an important role in determining organizational performance. Human resources are responsible for hiring capable employees with innovation and skills and at the same time retaining good employees. By having a good balance of capable employees, a firm's performance can be determined (El-Kassar & Singh, 2019). Other than that, customers' pressure on organizations to practice environmentally friendly products, will push organizations to perform better by implementing green concepts (El-Kassar, 2019). Hence, customer pressure has a significant effect on organizational performance. Government regulation will support the development of environmental regulations and increase an organization's competitiveness (Porter & Van der Linde, 1995). By following the regulation, organizations are able to reduce environmental damages and hence produce better business opportunities. From the factors given, the hypothesis can be developed as below:

H1a: There is a significant relationship between Top Management Commitment and Organisational Performance.
H1b: There is a significant relationship between Technical Aspect and Organisational Performance.
H1c: There is a significant relationship between the Integration Management System and Organisational Performance.
H1d: There is a significant relationship between Human Resource Management and Organisational Performance.
H1e: There is a significant relationship between customer pressure and Organisational Performance.
H1f: There is a significant relationship between Government Regulation and Organisational Performance.

Table 1: The ISO 14000 series of Environmental Management Systems

ISO 14000 Standard	Description
Environment Management System	An environmental policy statement indicating the SME's written and formal commitment to prevention/minimization of environmental impact and commitment to a system of continuous environmental performance improvement.
Environmental auditing	A system to objectively assess the SME's environmental performance including defined audit procedures, qualification requirements of auditors, and environmental site assessments.
Environmental labelling	These standards impact all promotions, from advertising to packing, and include claims, verification procedures, terms, use of symbols, and environmental criteria.
Environmental performance evaluation	This is a set of objective metrics and outcomes the SME must measure. The metrics include toxic inventory releases, energy utilization metrics, effluent metrics, and hazardous waste management metrics.
Life cycle assessment	The LCA is the core of ISO 14000, mandating that the SME explicitly consider the product's design, procurements, production, distribution, consumption, and disposition of impact on the environment.
Product standards	This standard considers environmental product design criteria and how design can be altered to enhance environmental performance.

Table 2: ISO 14000 family of standards

Standard Number	Details	
ISO 14001	EMS: requirement for the use of guidance	Requirement is expressed in Clause 4. Useful additional guidance in annexes which are advisory only.
ISO 14004	EMS: general guidelines on Principles, System and Supporting Technique	Useful background information on the approach to EMS installation.
ISO 14015	Environmental Assessment of Sites and Organisation (EASO)	Guidance useful for self-assessment or pre-acquisition auditing
ISO 14020- 14025	Environmental Labels and Declarations	Not directly relevant to EMS implementation. Useful only to those interested in taking part in an echo labeling scheme, or in making declarations concerning products and services with environmental aspects.
ISO 14031	Environmental Performance Evaluation- Guideline for environmental management	Very useful in establishing measurement for objectives and targets and environmental performance indicators as part of an EMS, or as a precursor to the installation of an EMS
ISO 14040-14048	Life Cycle Assessment	Could be useful in getting to grips with LCA as part of your IER.
ISO 14050	Environmental Management Vocabulary	Advisory but very useful to ensure that everyone is using a common terminology. Especially useful to those managing multisite operation environmental.
ISO 14063	Environmental communication	Guidance on the full range of environmental aspects of both internal and external communications

2.2. Relationship between Green Innovation and Organisational Performance

According to several studies (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013, Arenhardt et al., 2016, Chen, 2008; Chenet al., 2012; Yang et al., 2016; Karimi Takalo et al., 2021) green innovation (GI) has been proposed as an important element in environmental management. The rising trend in awareness in recent years has indicated the vital importance of green innovation for organizations and communities (Karimi Takalo et al., 2021). To address environmental deterioration and economic growth, an increasing number of businesses and communities are turning to GI (Fliaster & Kolloch, 2017). Green innovation is described as the process that changes the uniqueness of how things are done (Xue, Boadu & Xie, 2019). Green innovation, according to Xue, Boadu, and Xie (2019), is divided into four categories: technology, managerial functions, product design, and production method.

Definitions of green innovation (Table 3) reveal how stakeholders adopt green technology to enhance organizational goals while minimizing environmental impact. Green innovation may be a potent tool for enhancing a company's performance management, but few academics have acknowledged this (Tang, Walsh, Lerner, Fitza, & Li, 2018). Green innovation, according to Li, Zhao, Zhang, Chen, Li, Zhao, and Cao (2018), refers to the technological, product, service, and organizational structure adopted by businesses to achieve the long-term plan. Green innovation, according to some authors, is defined as innovative technology items or processes whose primary purpose is to reduce pollution, recycle trash, and produce energy-saving and environmentally friendly designs (Leenders & Chandra, 2013). According to Leal-Millan, Roldan, Leal-Rodriguez, and Ortega-Gutierrez (2016), GI has been highlighted as a critical strategy for companies with a mix of competencies and expertise that may help them achieve economic breakthroughs while minimizing their environmental impact. The organization works on fulfilling societal needs by utilizing the

natural environment and building on its relationship with environmental performance. As the company practices green innovation, it builds organizational performance and gains trust from key stakeholders. Hence, the hypothesis is developed as below:

H2: There is a significant relationship between Green Innovation and Organisational Performance.

Table 3: Definition of Green Innovation

Focus	Sources
Continuous innovation, new market opportunities, wealth creation	Walley, N.; Whitehead, B. (1994).
Quality of life, very profitable, not only in terms of efficiency	Hart, S.L. (1995).
Corporate image, successful companies	Porter, M.E. & Van der Linde, C. (1995).
Environmental burden	Driessen, P.H.; Hillebrand, B. (2002).
Concern not only the process but also the product	Noci, G. & Verganti, R. (1999).
Environmental management, requirement of environmental protection	Lai, S.-B., Wen, C.-T.,& Chen, Y.-S.(2003). Tang, Walsh, Lerner, Fitza, & Li, (2018); Antonioli, Mancinelli, & Mazzanti, (2013)
Hardware or software innovation, green products or processes, innovation in technologies, energy saving, pollution prevention, waste recycling, green product designs, and corporate environmental management.	Chen, Y.S., Lai, S.B. & Wen, C.T. (2006). Rennings,(2000) Xue, Boadu & Xie, (2019) Li, Zhao, Zhang, Chen &Cao,(2018)
Great effort in environmental management, avoiding the trouble of protests or punishment about environmental protection, corporate images, developing new markets, and competitive advantages.	Chen, Y.S. (2008).
Satisfy the requirements of environmental protection, devoted to developing green innovation, environmental regulations, and barriers to other competitors.	Chang, C.H. (2011).
Enhance product value, and offset the costs of environmental investments.	Chen, Y.S., Chang, C.H. & Wu, F.S. (2012).
Minimization of environmental impacts, management innovation, process innovation, product innovation, and technological innovation.	Tseng, M.L., Huang, F.H. & Chiu, A.S. (2012).
Technological improvements, energy saving, pollution prevention, waste recycling, green product design, and corporate environmental management.	Aguilera-Caracuel, J. & Ortiz-de-Mandojana, N.(2013).
Development of new technologies, save energy, prevent pollution, waste recycling, and eco-efficient design.	Leenders, M.A. & Chandra, Y. (2013).
Type of innovation reduced impact on the environment.	Hashim, R., Bock, A.J. & Cooper, S. (2015).
Strategic need for firms, great opportunities to prevent buyers harming the environment.	Leal-Millán, A., Roldán, J.L., Leal-Rodríguez, A.L. & Ortega-Gutiérrez, J. (2016).
Mitigate or avoid environmental damage, responsible and optimal use of available resources.	Albort-Morant, G., Leal-Millán, A. & Cepeda-Carrión, G. (2016).
Improve firm's performance, sustainable performance	Erkut,2016; Koellinger,2008; Cheng, Yang, & Sheu, 2014; Lee,& Min,2015; Tang, Walsh,Lerner, Fitza,& Li, 2018; Singh, Chakraborty & Roy, 2016

2.2. Relationship between EMS and Green Innovation

Top management is important in identifying environmental safety aspects and apply strategic planning for environmental management (Weng et al., 2015). Top management and the

implementation of green standards are directly related. Top management makes sure improvement in green innovation performance through communication (Drumwright, 1994). The combination of both technology and green innovation is able to produce better quality products. Green innovation is influenced by technological aspects, and it is reasonable to argue that these two aspects are positively related. Integrated management systems (IMS) help organizations to build clearer and more consistent support for meeting sustainability (Rebelo et al, 2016). According to empirical data (Hernandez-Vivanco et al., 2016, Simon & Petnji Yaya, 2012), there is a strong correlation between IMS and green innovation. Human resource management stimulates innovation by rewarding employees and giving recognition through their performance. The rewards system stimulates individual creativity and thus improves innovation performance (Podmetina, Volchek, Dabrowska & Fiegenbaum, 2013). Regarding customer pressure, research suggests that it is a major force promoting green innovation (Chu, Wang, & Lai, 2019). Another study found that customers are the most influential people in demanding for adoption of green innovation (Bask et al., 2018; Baz & Laguir, 2017). Government regulation and environmental practices are known as the strong link between government regulations and green innovation (Backer, 2007). Government regulation is thus expected to have a favourable impact on the uptake of green innovations. Therefore, the following hypothesis was made using the data above:

H3a: There is a significant relationship between top management and green innovation.
H3b: There is a significant relationship between technical and green innovation.
H3c: There is a significant relationship between the Integrated management system (IMS) and green innovation.
H3d: There is a significant relationship between human resource management and green innovation.
H3e: There is a significant relationship between customer pressure and green innovation.
H3f: There is a significant relationship between government regulation and green innovation.

3. Methods

3.1. Questionnaire Design

The creation of a validated research tool is the paper's particular goal. Figure 1 provides a detailed explanation of the procedure and the measurement items from previous research. Then, the survey instruments are developed based on the current study. Once the instrument developed, a properly designed questionnaire will be sent to industry experts and academicians to get their review and feedback to further enhance the questionnaire design. To fit the respondents and the study setting, these instruments were adjusted as necessary. This process solves the differences in context due to various reasons which are likely to ensure the validity and reliability of the measurement model and current studies are being compared with previous results. The questionnaires are being modified to adjust according to Malaysian manufacturing industries and the final instrument is ready to be distributed.

Several rules in selecting sample size for pilot testing are determined. Cooper and Schindler (2008) proposed a sample size of 25 to 100 respondents for the pilot study. Some researchers suggested running at least 50 samples for the pilot (Kumar et al., 2015; Perneger, Courvoisier, Hudelson, & Gayet-Ageron, 2015). Where else, other researchers suggest pilot testing sample sizes to be between 5 and 15 (Willis, 2005). Ferber and Verdoorn (1962), said that having 12 participants for pilot testing is sufficient. According to the researcher, there are no set guidelines for pilot testing. The pilot study's sample size was 30. The data from the pilot test were evaluated using SPSS, a statistical package for social science. Table 6 contains an overview of the pilot test results.

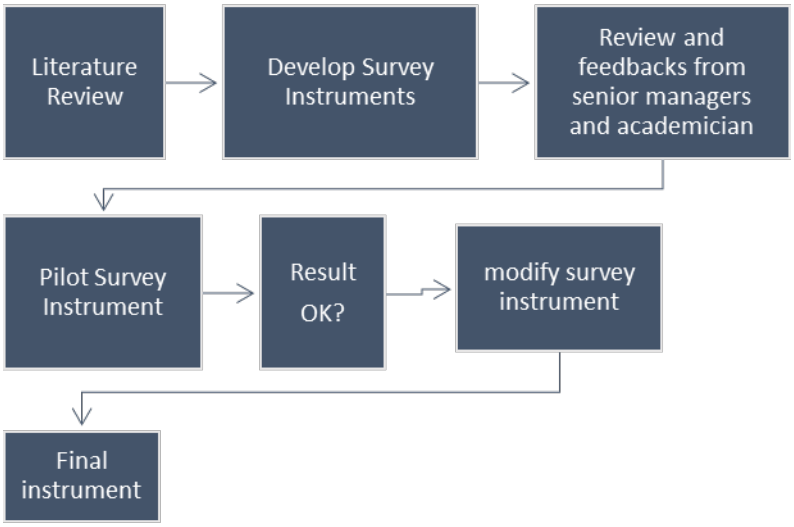

Fig.1: Research Methodology process

Table 4: Summary of items to measure each construct.

Constructs	Number of items	Number of questions	Source
Top management	3	12	P. Padma, (2008); Zutshi & Sohal, (2004)
Technological Aspects	3	12	Sambasivan & Fei, (2008)
Integration Management System	3	12	Bernardo et al.,(2015); Domingues et al., (2012)
Human Resource Factors	4	16	Sun et al., (2007); Renwick et al., (2013)
Customers pressures	4	16	Lai & Wong, (2012); Yen& Yen, (2012); Lin et al., (2013)
Government Regulations Pressures	4	16	Dean & Brown, (1995); Porter, (1991); King, (2000)
Green Innovation	2	8	Lai et al., 2003
Organizational Performance	5	20	Wagner, (2010) ; Hutchins & Sutherland, (2008); Maletic et al., (2015)

Table 4 shows an overview of all the structures, including the total number of items, questions asked for each item, and sources. All constructs are operationalized using Likert scales. Using Likert skills enables researchers to identify the response of participant opinion as the participant is given the choice to indicate if they strongly disagree or agree with the statement (Sekaran, 2010). Reliability coefficients can be achieved by using fewer items in five-point Likert scales (Baker et al., 1998). These aspects were tested in the field of marketing and science of social and it leads to stronger measures as it increases the variance of responses (Garland 1991).

Prior studies employed the questions outside of Malaysia and the source language for this

research was English. The current study will continue to use English as the respondents were largely from industries that registered under ISO14000/1 and holding manager's positions and above. However, the questionnaires were tested for the respondent's understanding due to differences in linguistics and culture.

3.2. Instrument Pretesting

Pretesting of the instrument was conducted via online meetings with academicians and specialists. Pretesting was conducted mainly to get a clearer opinion from both experts and academicians on issues such as wording, language clarity, and suitability of the scale (Zikmund et al., 2010). This further help to fine-tune the questionnaires before sending them to respondents with less error in this design (Alreck & Settle, 1985; Malhotra, 1999).

Each expert's conversation was held separately throughout the pretest procedure. To ensure that the instructions and the structure and layout of the questionnaire were fully understood, each question was carefully examined. After every discussion with experts, the questionnaires were improved (Table 5). The pretest was conducted mainly to identify if:

(1) The suitability of the length of the questions is up to the standard required.
(2) Any repetition of questions in different sections.
(3) The questions are incomplete and ambiguous.
(4) The question is Grammarly correct.
(5) The number of questionnaires is reliable during the final test.
(6) The structure of questionnaires incorrect forms.

Table 5: Below are some of the comments after the review with experts and academician:

1. Restructure some of the questionnaires to an ease of understanding.
2. Lengthy questions to be simplified in a simple easy to easy-to-understand structure.
3. Some questions had grammar issues and were corrected.
4. Some questions were repetitive and were removed and added with new questions.
5. Questions are appropriate for the experts to answer.

The study targeted responded at the position of managers and above working in manufacturing industries that are registered under ISO14000/1. A cover letter was sent to the targeted respondents to urge them to do the survey. To further ease in answering the survey, Likert scales appear on every new page. At the final stage, the questionnaires were modified and fine-tuned so that the survey be ready for pilot study.

3.3. Result of Pilot Test

The next step is to conduct a pilot study. The study uses convenience sampling to select the respondents. A pilot study is something like a trial run to ensure a complete study is being carried out successfully (Polit, Beck & Hungler, 2001; Memon, Ting, Ramayah, & Chuah, & Hwa, 2017). Finding the questionnaires' advantages and disadvantages is the main justification for performing pilot research (Nardi, 2006). The pilot study helped to make sure that the research tools were used properly, and that respondents had a clear understanding of the questionnaires (Hair et al., 2010). Furthermore, the test was conducted to capture the distinctive items' reflections on the construct. The respondent that answered the survey was mostly Senior Manager (36.67%), Managers (36.67%) and followed by General Manager (20%) and President/Vice President (6.6%). The data is presented in Figure 2. Meanwhile, most of the respondent mentioned that their company operates around 8-11 years (30%), > 12 years (26.67%), followed by 4-7 years (26.67%) and 1-3 years (16.67%). This data is

explained in a chart in Figure 3. In Figure 4, data indicates that most of the companies established EMS around 2016-2020 (47%). Around 30% said that their company established EMS in 2011-2015 (30%), followed by 2006-2010 (13%) and in 2000-2005 (10%).

Table 6: SPSS analysis for pilot test

Demographic Variable	Variable sub-group	No. of Respondents	Percent (%)
Job Title	Senior Manager	11	(36.67%)
	General Manager	6	(20%)
	Manager	11	(36.67%)
	President/ Vice President	2	(6.67%)
Years of Operation	1-3 years	5	(16.67)
	4-7 years	8	(26.67%)
	8-11 years	9	(30%)
	>12 years	8	(26.67%)
Years EMS was established	2000-2005	3	(10%)
	2006-2010	4	(13.33%)
	2011-2015	9	(30%)
	2016-2020	14	(46.67%)

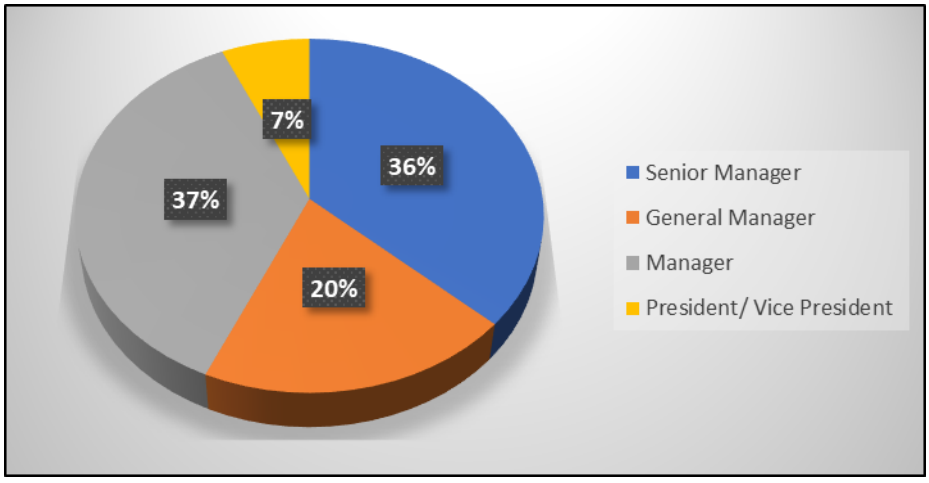

Fig.2: Respondents by Job Titles

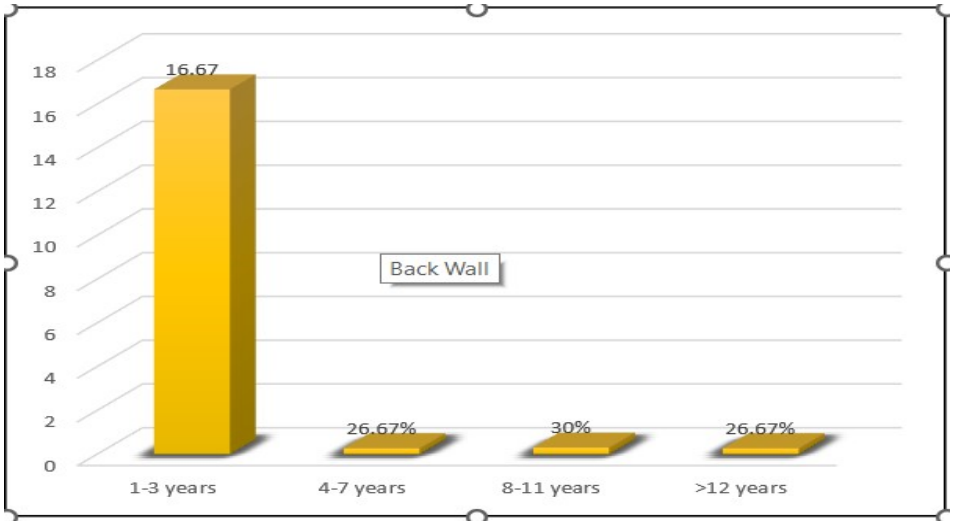

Fig.3: Years of Companies Operations

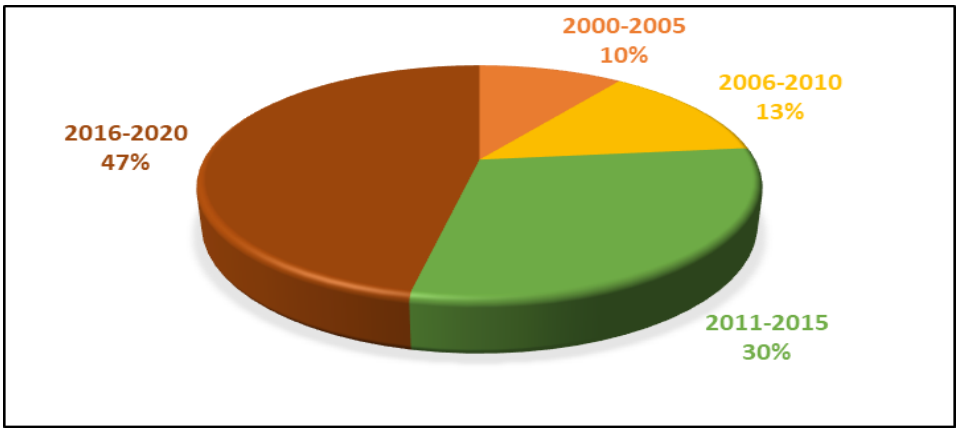

Fig.4: Years Companies Establish EMS

Table 6: Reliability Test

Main Constructs	Constructs	Dimension/measurement	Cronbach Alpha	No. of Item
Environmental Management System (EMS)	Top Management Commitment	Environmental Policy	0.898	4
		Allocation of Resources	0.88	4
		Management Review	0.874	4
	Technological Aspects	Measuring Equipment	0.796	4
		Environmental Specialist	0.749	4
		Process Enhancement	0.893	4
	Integrated Management System	Integration Strategy	0.848	4
		Integration Methodology	0.661	4
		Integration level	0.778	4
	Human Resource Factors	Employee Empowerment	0.75	4
		Employees Training	0.819	4
		Reward and Recognition	0.969	4
		Teamwork	0.706	4
	Customers Pressure	Customers Awareness	0.639	4
		Customers Preference	0.818	4
		Environmental Issues	0.639	4
		Customers Concern	0.692	4

Main Constructs	Constructs	Dimension/measurement	Cronbach Alpha	No. of Item
	Government Regulations	Technology Standard	0.759	4
		Fines and Penalty	0.749	5
		Emissions Standards	0.852	4
		Collaboration Network	0.6	4
Mediating	Green Innovation	Process Innovation	0.931	4
		Product Innovation	0.852	4
Dependent Variable	Organizational Performance	Economic Performance	0.865	4
		Social Performance	0.803	5
		Environmental Performance	0.665	4
		Innovation Performance	0.9	4
		Financial Performance	0.881	4

The dependability of the survey instrument was evaluated (Table 6). When the reliability coefficient, also known as Cronbach's alpha, is 0.7 or greater, good dependability can be attained (Hair et al., 2010). A CR of 0.7 or greater denotes strong reliability, according to the construct reliability (CR) rule of thumb (hair et al., 2010). Low range acceptability is indicated by a Cronbach alpha of (0.6-0.7). Any value report that falls within this range or higher shows a satisfactory level of consistency. The table below offers a general guideline for Cronbach Alpha as recommended by Hair et al. (2003).

Table 7: Cronbach Alpha Table (Hair et al., 2003)

Alpha Coefficient Range	Strength of Association
<0.6	Poor
0.6 to<0.7	Moderate
0.7 to <0.8	Good
0.8 to <0.9	Very Good
0.9	Excellent

The scales demonstrated high internal consistency, according to the results of the reliability test. The range of 'Cronbach's alpha coefficients was 0.6 at the low end and 0.969 at the top. Since Cronbach Alpha is 0.6 or above, all variables are thus at an acceptable level. This demonstrated the reliability of the surveys and corroborated the initial consistency. Therefore, no additional adjustments to the questionnaires are needed.

4. Conclusions

Pretesting was conducted using industrial and academic experts to identify any issues or problems in questionnaires. Some issues were found in the questionnaires in terms of repetition of questions, language issues, unclear statements, and irrelevant questions. All the issues were corrected, and the layout of the questionnaires was modified accordingly. Face validity helps to rectify problems and solve them immediately. This, furthermore, enhances the understanding of respondents towards the questionnaires. In addition, the pilot study helps further improve the questionnaire's reliability and validity. The quality of the outcomes will be improved by well-designed surveys. The results of the pilot study demonstrate that the study is pertinent, and the questionnaires can address the study's objectives. The certified instrument was prepared to be given to industry experts once all the revisions had been completed.

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