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Investigating the factors influencing Australian logistics companies toward environmental activity adoption

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Abstract

Purpose – This paper aims to examine 12 factors influencing environmental activity adoption by Australian logistics companies.

Design/methodology/approach – After a literature review and collect the major factors influencing environmental activity adoption, exploratory factor analysis (EFA) and Friedman test are used to cluster and prioritize these factors through a Web survey.

Findings – The results of EFA show that these factors belong to three main groups including social and economic, pressure and governmental factors. The results of a Friedman test prioritizes 12 factors to find which factors have the greatest importance toward the adoption of environmental activity by managers of Australian logistics companies and reveals that governmental regulation, fuel and energy prices and the potential for achieving a competitive advantage, had the first to third ranking, respectively. Some new influencing factors in implementing environmental activities are found such as the willingness to be the market leader, responsibility and risk mitigation.

Research limitations/implications – This paper contributes to the literature by exploring the new factors influencing environmental adoption.

Practical implications – Australian logistics managers can use the results of this paper in developing their strategies and public policymakers can also use these results to improve sustainable development.

Originality/value – This is the first paper that clusters and prioritizes factors influencing environmental adoption in the Australian logistics industry.

Keywords Environmental activity adoption, Influencing factors, Logistics management

Paper type Research paper

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1. Introduction

Increasing awareness of environmental issues and the notion of sustainable development has been affecting the business world in implementing environmental activities (Čekanavičius *et al.*, 2014). Some scholars such as Trivedi (2016) and Kwak *et al.* (2018) claim that environmental management and processes in the supply chain not only protect the environment but also benefit companies as a strategic tool for gaining competitive advantage. However, the level of environmental adoption is still needed to improve. Therefore, government and public policymakers need to know that what factors and to what extent can drive companies toward environmental activity adoption. Prioritizing these factors and identifying new drivers facilitate the decision-making process to improve environmental adoption. This paper clusters rank the existing factors in the literature to empirically answer the following research question (*RQ*) and identify new influencing factors:

RQ. Which factors have a greater influence on logistics toward adopting environmental activities?

2. Literature review

The commitment of an organization or government to the laws, regulations and other policy mechanisms concerning environmental issues is titled environmental policy to address some issues such as water and air pollution and waste management (Eccleston, 2010; Banovac, *et al.*, 2017). The process of integrating environmental objectives into non-environmental policy areas such as energy and transport is known as the concept of environmental policy integration (Farah and Rossi, 2011). Environmental activity adoption may benefit companies as well when they are implemented to protect the environment.

Australia has a lot of port and logistics industry is one of the significant sectors that contribute to Australia's economy. Every industry in Australia depends on logistics and transport (Australian Logistics Council, 2014). Moreover, the logistics industry can play a vital role in decreasing carbon footprint and emissions by environmental activity implementation (Kim and Han, 2011). Identifying the factors encouraging Australian logistics companies for environmental adoption may facilitate and improve the level of environmental adoption.

2.1 Factors influencing environmental adoption

Some influencing factors are common among several types of companies such as legislation and government regulations (Tacken *et al.*, 2014) while others differ from one business to another. One of the most effective external factors is the government (Ahani *et al.*, 2017; Lorentz *et al.*, 2011) which provides both pressure (Isaksson, 2012; Walker *et al.*, 2008) and support (Lin and Ho, 2011). The role of government as a moderator in sustainable competitiveness of supply chain (Sheetal *et al.*, 2020; Lin and Ho, 2011). The explicitness of technology, accumulation of technology and organizational encouragement for acquiring new technologies are technological factors recognized as the internal factors of an organization (Ramdhani *et al.*, 2017; Zientara and Zamojska, 2018). Organizational factors include stakeholder pressure, the size of the company, industry sector and geographic location, strategic and managerial attitudes, position in the supply chain and characteristics of human resources (Lee *et al.*, 2018; Seroka-Stolka, 2014). Smaller businesses are under pressure from business partners within the supply chain due to having strong collaboration

among them (Hung Lau and Wang, 2009; Walker *et al.*, 2008). Employees' interests are an internal driving factor (Zientara and Zamojska, 2018; Isaksson, 2012).

However, there are some factors from the external environment influencing a company's environmental adoption such as environmental certainty, governmental support and environmental innovation (Ahani *et al.*, 2017; Chien and Shih, 2007). Other examples are pressure of negative media attention and of public authorities, society's perception of the company as external factors and the company's brand (Lee *et al.*, 2018; Salomone, 2008). Increased competitiveness or economic means of control, the pressure of stakeholders such as top management, employees are also indicated as prominent drivers by Isaksson (2012) and Lee *et al.* (2018) while increased pressure from investors is indicated as a strong internal driver by Walker *et al.* (2008) and Lee *et al.* (2018).

Customer pressure as an external driver motivates companies to increase investment for greater environmental accomplishment objectives (Testa *et al.*, 2018; Tacken *et al.*, 2014; Isaksson, 2012; Seroka-Stolka, 2014). Although Isaksson (2012) and Mason (2014) claim that pressure from suppliers is an external key driver, Walker *et al.* (2008) and Salomone (2008) believe that it cannot be a driving factor. As the positive relationship between suppliers' power and competitiveness is confirmed by Sheetal *et al.* (2020), pressure from suppliers in terms of environmental adoption may work as a driver. The company, customer, politics and society also have their effect on the implementation of environmental activities (Lee *et al.*, 2018; Seroka-Stolka, 2014). Competitor pressure, market competitiveness, the environmental policies of competitors and new market opportunities are significant motivations for companies to implement environmental activities (Salomone, 2008; Dubey *et al.*, 2015). The price of energy is another influential factor toward environmental adoption (Luthra *et al.*, 2015; De Medeiros *et al.*, 2014; Rezvani *et al.*, 2015).

There are some similar studies in other countries. The structural characteristics of companies greatly influence the attitudes toward environmental adoption (Aguado and Holl, 2018). The social value of the technology and the willingness of the incumbent car industry to position itself in this new market are factors influencing electronic vehicle adoption (Künlea and Minke, 2022). From the perspective of society, business and environment, pollution tax for port users and using supportive incentives to reduce the pollution are pollution reduction policies to improve environmental management that are investigated in Taiwan ports (Tseng and Ng, 2020).

Overall, influencing factors have their weak or strong impact on a company's environmental adoption and they are worth investigating. Although there are several influencing factors indicated by scholars, this research selects the most cited factors related to logistics context to investigate. some factors such as competitor pressure and market competitiveness that are the same in their nature and different in words, considered as a factor. Therefore, 12 factors are finally selected and examined in this study.

3. Methodology

The influencing factors selected from the literature have not been previously explored in the case of the Australian logistics industry. Therefore, the sample of this research was asked to give a score to each influencing factor through a quantitative web-based survey based on its important degree for encouraging logistics companies for implementing environmental activities. The pre-test is conducted in research to enhance the final version by the use of feedback for revising and refining the questionnaire (Leggett, 2017; Hilton, 2017), as well as to test the validity and appropriateness of the questions (Krosnick, 2018). The unit of analysis is an individual, senior managers sampled in all states of Australia, are invited to participate in this research. Random sampling is used because an equal chance of being selected by each

member of the population is its advantage to decrease bias (Sen and Singer, 2017). The target population of this research was finite, thus, the table developed by Krejcie and Morgan (1970) is used to determine the sample size which is 297. Thus, this research applies a 95% confidential level and 5% margin of error for the targeted population to provide a reasonable balance between the value of the result and the cost of collecting data.

In total, a 21% response rate was achieved because 61 questionnaires of 88 received responses were fully completed. The response rate of this research giving reasonable credence when it is compared with other web-based surveys of research in green supply chain and logistics management. For example, the response rate is 21.5% in the research by Chavez *et al.* (2016) and it is also 21.5% in the research by Szegedi *et al.* (2017). The response quality for data obtained is considered high when the average number of questions respondents leave unanswered is small (Jordan *et al.*, 2014; Sue *et al.*, 2007).

A non-response bias may contaminate the reliability of the study's results when the survey response rate is less than 100% (Shang and Lu, 2012). To conduct a test of non-response bias, the 61 completed responses were divided into two groups, early ($n = 30$, 49.2%) and late ($n = 31$, 50.8%) respondents for assessing the non-response bias. The results showed that there were no significant differences between the two groups. Therefore, this suggested there is no evidence of non-response bias for this research study. For the reliability of the questionnaire, the Cronbach's alpha coefficient is 0.891, which is calculated by SPSS software for all 12 investigated factors.

4. Data analysis and results

Exploratory factor analysis (EFA) and the Friedman test are used to explore the main components among influencing factors and find a latent variable, as well as cluster and rank the influencing factors.

4.1 Exploratory factor analysis

EFA is used to categorize influencing factors and identify the underlying latent relationships between them because it is an appropriate technique to define a hypothesis in terms of the number of underlying factors of data and their relationship (Fabrigar and Wegener, 2011). EFA is an exploratory technique (not a confirmatory technique), which is used for exploring the factor structure of a set of observed variables without imposing a predefined structure on the outcome (Osborne, 2015; Reio and Shuck, 2015; Baglin, 2014). The common or shared variance between variables is the basic element of EFA, which is from the leftover variance unique to each variable and any introduced measurement error (Baglin, 2014). EFA is the most appropriate technique for this study because there is not a previous hypothesized structure and the table of influencing factors in the current study was developed and tested for the first time. In addition, EFA is used when the researcher cannot assume the priority or the structure of the variables, as well as the relationships between them and needs to rely on the sample to estimate these (Matsunaga, 2010). The recommended sample size in factor analysis is 5 to 10 for each variable (De Winter and Dodou, 2010). Kaiser-Mayer-Olkin (KMO) is the index of SPSS software for investigating and yielding a suitable sample size for EFA. The value of KMO must be more than 0.7 (Yong and Pearce, 2013) to show that the number of data observations has been sufficient for EFA. The value of KMO and Bartlett's index for question 31 is 0.818 which is more than 0.7. Thus, it shows that the number of data observations has been sufficient for EFA.

EFA was used to categorize 12 factors influencing environmental adoption which still have more than 70% of the variance. The SPSS output shows that there are three components with more than 70% of the total variance. Therefore, 12 influencing factors

were found to be dependent on three latent components. The percentage of variance is 47.450, 13.484 and 9.689 for components one, two and three, respectively. Percentage of cumulative is 47.450, 60.934 and 70.623 for components one, two and three, respectively. Figure 1 illustrates that the eigenvalue for the first three components is more than one whereas for the other components it is less than one.

EFA run and three components were extracted. As the amounts of the coefficient for the factor with the least coefficient (demand for environmental logistics services) were close among three components, EFA runs for the second time to have a clearer clustering after eliminating this factor. The value of KMO and Bartlett's index in the second run of EFA is 0.784 which is more than 0.7. It means that the number of data observations has been sufficient for EFA. Table 1 presents the results of the second run of EFA with the coefficient of each factor.

4.1.1 Social and economic factors. The first component of EFA, which has around 50% of the variance, includes five influencing factors which are the most influential. These five influencing factors belong to component 1 because their coefficient in component 1 is more than their coefficient in components 2 and 3. A social awareness which includes demand for environmental services is a strong external factor toward environmental adoption (Isaksson, 2012; Lin *et al.*, 2014) that is confirmed by the current paper. A company's attempts to have environmental responsibility and offering environmental services can satisfy aware customers (Salomone, 2008). In addition, media can play an important role to introduce responsible or irresponsible companies to society (Isaksson, 2012). Consequently, a good image for a company affects brand popularity and provides new market opportunities. Therefore, social awareness is an external influencing factor motivating the sample for environmental adoption. Some scholars (Hung Lau and Wang, 2009; Walker *et al.*, 2008) claim that smaller companies are under pressure from business partners within the supply

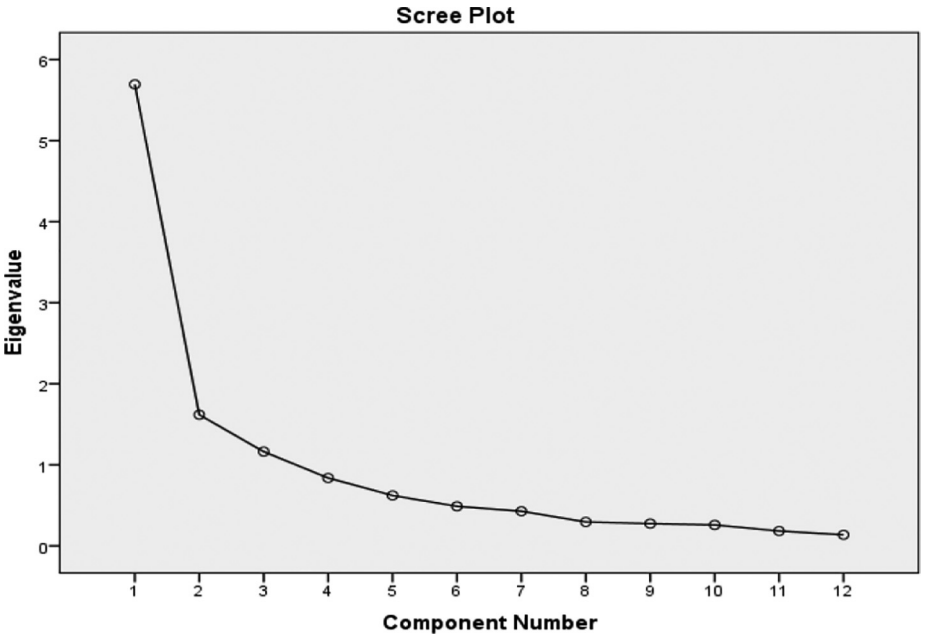

Figure 1.
Components and their eigenvalue

Factors influencing environmental adoption	Components 1	2	3
Social awareness	0.827	0.090	0.244
Company growing in size	0.817	0.254	0.259
Potential for achieving a competitive advantage	0.781	0.219	0.339
Increasing fuel and energy prices	0.753	0.024	0.158
Employees' interest in environmental activity adoption	0.662	0.187	−0.180
Suppliers' pressure	0.012	0.830	−0.115
Competitor pressure	0.324	0.708	0.346
Accumulation of new technologies	0.179	0.698	0.335
Customer pressure	0.287	0.642	0.460
Governmental regulations	0.181	0.114	0.885
Governmental support	0.151	0.226	0.831

Table 1. Components of exploratory factor analysis

chain due to having strong collaboration among them. The results of the current study confirmed it and showed that the size of the company is a factor influence environmental adoption.

The results confirmed that the potential to achieve a competitive advantage is one of the strong factors that positively influence the sample for environmental adoption. Creating value for customers is a fundamental means of achieving a competitive advantage and a company can follow two generic routes to compete in a market to create super value for customers: differentiation or low cost which can create a competitive advantage (Porter, 2011). As carrying out environmental logistics services can create differentiation and customer value, environmental activity adoption has the potential for achieving a competitive advantage (Isaksson, 2012; Salomone, 2008). Therefore, leading logistics companies can use environmental adoption as a means of achieving a competitive advantage.

Increasing fuel and energy prices are indicated as an influencing factor for environmental activity adoption (Luthra *et al.*, 2015; De Medeiros *et al.*, 2014; Rezvani *et al.*, 2015). The results of the current study confirmed it as an influencing factor, which acts as an external driver for implementing environmental activities. The results of EFA confirmed that employees' interest also acts as an effective influencing factor in the sampled Australian logistics companies for environmental adoption. This factor is an internal factor, which also drives Chinese logistics companies toward environmental adoption (Lin and Ho, 2011). Other factors such as the quality of the human resource, characteristics of human resource and the opinion of top manager are the same factors indicated by scholars (Seroka-Stolka, 2014; Lin *et al.*, 2014) and may belong to this group.

4.1.2 Pressure factors. The influencing factors of this component are discussed in order of their strength according to their coefficient in the second component of EFA. The results of EFA confirmed that supplier pressure is a strong influencing factor toward environmental adoption as indicated by Isaksson (2012) and Tacken *et al.* (2014). Some scholars such as Salomone (2008) and Walker *et al.* (2008) claim that suppliers' pressure may not be an influencing factor for environmental adoption, which is not confirmed by the results of the current study for sampled Australian logistics companies because the coefficient of this factor is high which shows the strength of this factor in the pressure group.

EFA results confirmed that the competitors' pressure in the competitive market for capturing new market opportunities is a significant influencing factor for companies to implement environmental activities suggested by scholars (Salomone, 2008; Dubey, 2015;

Tacken *et al.*, 2014). Existing rivals adopting environmental policies and having the aim of being an environmental leader in the market drive logistics service providers to integrate environmental aspects into their activities to increase market share (Isaksson, 2012).

The results set the accumulation of technology in the component including three external factors which put pressure on the sample toward environmental adoption. Therefore, emerging new technology can be another pressure from the external environment affecting the sample for environmental adoption which is confirmed by EFA in the current study. Although Chien and Shih (2007) believe that the accumulation of new technologies is an internal influencing factor putting pressure on companies for environmental adoption, Coyle *et al.* (2016) claim that new technology is one of the external factors that affect the business environment.

EFA results showed customer pressure is an external factor influencing the sample of this study for environmental activity adoption. Scholars such as Gunasekaran and Ali (2015) and Isaksson (2012) believe that customer pressure is an external influencing factor motivating a company for environmental adoption. Customers' pressure prominently is indicated by scholars (Tacken *et al.*, 2014; Trivedi, 2016) because mature markets put pressure on companies to satisfy their customers with more customized and comprehensive value offerings. Changing customers' needs increases competitiveness and influences competitive advantage (Sigalas *et al.*, 2013). Creating value for the customer is the essence of competitive advantage (Porter, 2008) and achieving a competitive advantage is one of the ways of surviving in the competitive business environment.

4.1.3 Governmental factors. Based on EFA results, governmental regulation and support belong to the third component. Comparing the coefficient of governmental regulation and support with the other factors in Table 1, these two factors were confirmed to be the most influential factors toward environmental activity adoption in the sample of this paper. The result of the current paper is consistent with that of Lin and Ho (2011), indicating the regulatory pressure is an external factor, which influences companies to adopt environmental activities in Australia as same as Chinese logistics. The results are also designed with the findings of Lorentz *et al.* (2011) that states one of the most effective external factors is a government which provides both pressures (Isaksson, 2012; Walker *et al.*, 2008) and support (Lin and Ho, 2011). The results are also consistent with that of Tacken *et al.* (2014), indicating legislation is an influencing factor toward environmental adoption. According to the EFA results of this research, there is a latent dependency between governmental factors whether of regulations or support, therefore, they are clustered in the same group.

EFA is an appropriate method to cluster the influencing factors while the Friedman test is chosen to rank these factors based on their importance for sampled companies. Demand for environmental services as an influencing factor was considered again in the Friedman test.

4.2 Friedman test for ranking influencing factors

Friedman's test is a non-parametric statistical test that is developed by Milton Friedman. According to the Friedman test statistics, assuming the equivalent rank of influencing factors is not acceptable, thus, these factors can be ranked based. This test is useful for comparing three or more matched groups. Friedman's test first ranks the values in each matched set (each row) from low to high (Golghamat Raad, 2019). The Friedman test not only economizes on the number of statistical procedures but also indicates if underlying factors or subgroups have contributed to any significant results (Pandit, 2010). Thus, the Friedman test can be appropriate to recognize factors with greater influence on logistics

managers to adopt environmental activities. In the Friedman test which was done based on the original 12 influencing factors, the amount of test statistic is 114.753, degree of freedom (DF) is 11 and p-value is 0.000.

Table 2 shows the mean and rank for each influencing factor to identify the most and the least factors that influencing the sample of this study toward environmental adoption.

Although some scholars such as Lorentz *et al.* (2011) consider governmental regulation and governmental support as a single governmental factor, others such as Lin and Ho (2011) and Isaksson (2012) considered them separately, but there is a lack of comparison for these two separated factors in the literature. Therefore, this paper considers them separately to determine their importance and differences between them. The results of this study reveal that governmental regulation (first rank) is stronger than governmental support (fifth rank) because government regulations are compulsory and put direct pressure on companies toward environmental activity adoption.

Increasing fuel and energy prices has the second rank showing that this factor is one of the most influential factors for environmental activity adoption in the sample of this study. As transportation and freight forwarding, as well as storage and warehousing, are the main logistics services, the use of energy-efficient vehicles and environmentally energy sources to reduce the fuel and energy costs are appropriate ways to mitigate the risk of increased fuel and energy prices.

The potential for achieving a competitive advantage is the third important factor, which affects the sample in environmental activity adoption. Some factors such as the potential for achieving competitive advantage can be a stronger influence for leading companies that intend to create a competitive advantage through improving sustainable performance and being a market leader (Chan *et al.*, 2012; Eloranta and Turunen, 2015; Gao, 2013; Lorentz *et al.*, 2011). The results revealed that achieving a competitive advantage in market competitiveness is a significant motivation for companies to implement environmental activities as claimed by scholars (Salomone, 2008). Integrating environmental aspects into logistics activities increase market share and helps logistics service providers for being an environmental leader in the market (Liu *et al.*, 2017). Moreover, investment in environmental initiatives stimulates innovation development which leads to business efficiency (Tan *et al.*, 2015) and major competitive advantage (Isaksson, 2012). When increasing market share and being a leader in the market provides companies with a competitive advantage, environmental logistics is a source of competitive advantage (Cucchiella *et al.*, 2012). Therefore, the potential of environmental logistics for achieving a competitive advantage, as

Influencing factors	Mean rank	Rank
Governmental regulation	8.82	1
Increasing in fuel and energy prices	7.81	2
The potential for achieving a competitive advantage	7.72	3
Customers' pressure	7.56	4
Governmental support	7.14	5
Accumulation of new technologies	6.38	6
Social awareness	6.22	7
Demand for environmental logistics services	6.19	8
Competitors' pressure	5.98	9
Company's size	4.85	10
Employees' interest in environmental activity adoption	4.77	11
Suppliers' pressure	4.57	12

Table 2. Ranked factors based on the Friedman test

shown by the results of the Friedman test of this study, strongly motivates the sample to adopt the environmental activities.

The results of the Friedman test showed that customer pressure achieved fourth place in this study. This shows that the expectation of customers who are aware of environmental responsibility is a significant influencing factor, which positively affects the sample to adopt environmental activities as indicated by Seroka-Stolka (2014) and Isaksson (2012). The results of the Friedman test showed that pressure from the aware customer is stronger than the pressure from competitors and suppliers and strongly motivates the sample for environmental adoption because adoption of the environmental initiative is a strategic tool and business opportunity attracting new, aware and interested customers (Lieb and Lieb, 2010). Logistics companies' performance is based on an elevated understanding of customer requirements and is vital for achieving success for companies, as well as for the whole supply chain (Cucchiella *et al.*, 2012; Walker *et al.,* 2014). In addition, leading-edge logistics service providers concentrate centrally on customer needs and are highly equipped to meet these (Kim and Lee, 2012). Therefore, customer pressure is a strong influencing factor toward environmental adoption, affecting the performance of logistics companies, especially leading-edge companies, within supply chains.

Accumulation of new technologies is a factor influencing environmental activity adoption (Chien and Shih, 2007) which has approximately a midpoint (6.38) among the score 1–12. Similarly, social awareness had also a midpoint (6.22) among 1–12 scores. Demand for environmental services and social awareness including the pressure of media, public authorities and society's perception of the company are clustered in a group as strong influencing factors (Lin *et al.*, 2014; Salomone, 2008). Although social awareness, as well as its included items such as media pressure directly and indirectly (by increasing the awareness of customers) influence companies for environmental adoption, the results of the Friedman test, revealed that the pressure from aware customers with the fourth rank is stronger than social awareness because customers can directly affect the market share, sale volume and financial performance of companies. In addition, customers' demands and interests in regard to environmental initiatives in their purchasing of services have grown increasingly (Isaksson, 2012). Consequently, logistics industries need to implement environmental activities to offer acceptable services to their highly aware customers.

As in the first run of EFA, demand for environmental logistics services showed the least coefficient which had a very close amount among the three components of EFA, it was eliminated for the second run of EFA according to the literature (Isaksson, 2012), demand for environmental logistics services stems from social awareness and is more relevant to the pressure of future expectations and their consequences. The Friedman test placed it at the eighth rank after social awareness which confirmed the literature in terms of being close to social awareness. The Friedman test also confirmed the credibility of removing it in the first rank of EFA and integrating it into social awareness.

Competitor pressure is indicated as an important motivation for companies to implement environmental activities in the research by Dubey *et al.* (2015) and Salomone (2008), while in this study it is ranked ninth among 12 factors. However, when existing rivals adopt environmental policies, it drives logistics companies to integrate environmental aspects into their activities to increase market share (Isaksson, 2012) and even more, being an environmental leader in the market (Kim and Lee, 2012). Existing rivals adopt environmental adoption to attract aware customers and meeting customers' needs due to customers' pressure. Rivals' adopting environmental activities become a competitor pressure which motivates other companies' adoption. Therefore, customers' pressure is

stronger than competitor pressure (confirmed by the results of Fridman test) which directly and indirectly pushes logistics companies for environmental adoption.

The company growing in size as an internal factor (Seroka-Stolka, 2014) had the least effect (9th and 10th rank, respectively) on environmental activity adoption. According to Porter's five forces model (Porter, 2011; Porter, 2008), competitors' strategies influence the market. Competitors' strategies in terms of environmental activity adoption can also impact the market and act as a pressure factor. Moreover, corporate social responsibility can affect a company's marketing strategies (Dubey *et al.*, 2015) and influence the market. The results showed that the influence of competitors' pressure on the sampled logistics companies toward environmental activity adoption is not high. Walker *et al.* (2008) and Salomone (2008) believe that supplier pressure cannot be a driving factor while Isaksson (2012) claims that pressure from suppliers can be an external key driver to adopt environmental activities. The results of the Friedman test indicate that suppliers' pressure and employees' interest in environmental activity adoption have the least effects on Australian logistics companies in adopting environmental activities among all 12 considered factors.

Comparing the results of EFA and Friedman tests reveals that the prioritized factors at the highest ranks of the Friedman test do not belong to the specific cluster of EFA. However, the influencing factors at the second and third ranks of the Friedman test have belonged to the economic cluster. These factors are followed by customer pressure which is the most important pressure factor from this group. The possible reason may be that customers provide profit for companies. Accumulation of technology has the highest mean after customer pressure in the pressure cluster. In the government cluster of EFA, regulation has more effects on companies for environmental adoption compare with governmental support.

4.3 New influencing factors indicated by respondents

The new influencing factors indicated by respondents can be grouped based on their context. The groups are competitiveness, responsibility, financial, risk factors, accessibility, fuel efficiency and the interest of the owner of a company in buying fuel-efficient vehicles, as well as the development of global carbon markets (trading schemes) and auditing programs.

5. Conclusion

Identifying factors motivating companies to implement environmental activities and prioritizing them can facilitate and improve environmental adoption. This study conducted a literature review on environmental adoption and influencing factors toward it and extracted 12 factors. Then, the managers of Australian logistics companies were randomly chosen as a sample of study for engaging in a web survey. The respondents were asked to score these factors based on the effects of these factors on their company for implementing environmental activities. EFA was used to cluster them and the Friedman test was used to rank 12 factors based on the views of Australian logistics managers. The results of the EFA indicated there are three main groups influencing environmental adoption including social and economic, pressure and governmental factors. The Friedman test was used to rank the influencing factors and showed that governmental regulation, fuel and energy prices, as well as the potential for achieving a competitive advantage, had the first to third ranks, respectively.

6. Implications and future research

This paper contributes to the literature of influencing factors on environmental adoption and represents some new influencing factors to implement environmental activities. This study uses EFA and Friedman test separately for clustering and

ranking influencing factors and then compares their results. Comparing Results of the EFA and Friedman test shows that influencing factors of different nature may have significant effects on logistics companies to implement environmental activities. Identifying these new influencing factors can help companies to develop their strategies, as well as policymakers and regulators to establish new regulations and policies to increase sustainable development.

Future research can use the application of this research to investigate more influencing factors and barriers in the logistics context in Australia, other countries and in other industries.

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