

# Uncertain Supply Chain Management

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## The effect of corporate entrepreneurship, organizational culture on supply chain management and business performance in chemical industry

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### ABSTRACT

The article is purposed to assess the impact of corporate entrepreneurship on organizational culture, supply chain management performance and business performance. Particularly, it examines the moderating role of organizational culture and corporate size on the relationship between corporate entrepreneurship and business performance. The research is carried out on 96 chemical companies in Vietnam, using PLS-SEM technique. The results indicate that organizational culture and company size had moderating role effected positively by corporate entrepreneurship to business performance through organizational culture and supply chain management performance.

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## 1. Introduction

Chemical industry plays an important role in Vietnam economic development, providing incoming materials for many necessary manufacturing industries including production and consumption of fertilizers, paints, printing inks, pesticides, detergents, etc. In 2018, the chemical industry contributed approximately 3000 million USD, accounting for 1% of total export turnover of Vietnam. There are 8 product categories in the chemical industry: fertilizers and nitrogen compounds, detergents, primary plastic resins and synthetic rubber, basic chemicals, paints and printing inks, pesticides, man-made fibers and other chemicals. One of the greatest weakness of the Vietnam chemical industry in 2018 was poor capability of incoming materials, therefore, most incoming materials for the industry are imported. In many consecutive years, chemical was always ranked in top 10 the most imported product and China was the major import market. Almost technical and machinery system in the chemical industry is at fair average level compared with some regional countries, resulting that production capacity of the industry is not high and added value is low. In addition, the industry involves with many specific risks, particularly, risk of safety in use and risk of environmental pollution in the chemical industry. Most medium and small-sized companies in the industry are facing tough competition with multi-national corporations with better financial potential, technological level as marketing strategy. Therefore, entrepreneurship of manager and organizational culture will significantly affect to supply chain

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management performance and corporate business performance. Research of entrepreneurship were carried out by many researchers, especially in developed countries. However, in a country with developing economy like Vietnam, there is a little research of the topic. Particularly it is in the context of global supply chain of Vietnam chemical industry. The purpose of this article is to measure the effect of CE to business performance through improvement of supply chain management performance in the chemical industry. Apart from introduction part, the research includes: Research overview; research methodology, research result, discussion and recommendation.

## **2. Literature review and development hypothesis**

### *2.1. Corporate entrepreneurship and business performance*

Corporate entrepreneurship (CE) has nourished over the past four decades (Kuratko, 2010). Corporate entrepreneurship attracted interests of both researchers and corporate managers. CE is an important factor that helps a corporate develop and builds up its reputation (Ireland et al., 2003). Vietnam chemical companies in particular and global companies in general always pay attention to and focus on CE because it creates innovation, persistence, risk tolerance and code of business conduct and social responsibility (Kuratko & Audretsch, 2009). CE is an important strategy for all types of businesses (Morris et al., 2011). Previous studies indicated that CE significantly influenced on business performance (BP) through image improvement, market expansion, “angel investor” attraction and increase of corporate business performance (Heavey & Simsek, 2013; Frese et al., 2014; Baron & Kenny, 1986). Therefore, we assume that:

H<sub>1</sub>: Corporate entrepreneurship is positively associated with business performance.

### *2.2. Organizational culture and business performance*

Organizational culture (OC) (Barney, 1986) is formed and developed in parallel with corporate development process, not only through a communication culture but also through core values, rules, management styles, business methods and behaviors, attitudes of all members in a company (Mckinnon et al., 2003). Organizational culture of a corporate also has decisive effect on occupational spirit, attitude, motivation of members and use of workforce and other factors help company become a working community in the spirit of cooperation, trustworthiness, close-knit, friendliness and go-ahead, thereby establish a common mentality and confidence for the success of a business (Yilmaz & Ergun, 2008). From resource-based view (RBV), OC is a special, unique and inimitable resources of a corporate (Hall, 1993). Leaders having vision will turn organizational culture into competitive advantages in a corporate (Kuratko & Welsch, 2004). In addition, entrepreneurship will create positive OC as an important factor in organizational renovation and development of business activities strategies in a corporate (Prajogo & Sohal, 2001). Therefore, originating from resource-based view, a corporate investing and building up organizational culture in a good manner will bring competitive advantages and business performance in the future. Therefore, we assume that:

H<sub>2</sub>: Organizational culture is positively associated with business performance.

### *2.3. Moderating and mediating role of Organizational culture*

Covin and Slevin (1991) introduced an integration model analyzing the relationship among corporate entrepreneurship and environment, strategy, internal control system and organizational performance. Guth and Ginsberg (1990) reported that there is a two-way mixed relationship between CE and BP. In contrast, Zahra (1991) pointed that there is no convincing evidence of a direct relationship between CE and BP. CE helps create a new culture for a corporate, create “start-up” culture, culture of positive thought, enterprising spirit, always innovate, along with culture of business conduct and social responsibility. Since then, it gives employees confidence for the success of a corporate and working with higher productivity resulting in improvement of business performance of a company (Sila & Ebrahimpour, 2005). Similarly, a corporate with good CE will create good image for investors,

customers and stakeholders leading in easy access of capital, customer loyalty to the company and better business performance. Therefore,

H<sub>3</sub>: Organizational culture has mediating role in the relationship between CE and BP.

A corporate with positive, unique and inimitable OC will make CE easily successful because it has good foundation to support for all innovation, access of new science and technology, new market, new product of a corporate (Prajogo & McDermott, 2005). In case of new project, an innovated company has to pay costs for research and requires employee engagement and effort and the most important matter is capital called from “angel investors”, but a “famous” corporate in poor business performance is hard to carry out successfully a new project and bring good business performance (Zahra & Garvis, 2000). Therefore, we assume that:

H<sub>4</sub>: Organizational culture has moderating role in the relationship between CE and BP.

#### *2.4 Mediating role of Supply chain management performance*

In general, business environment mentioned resources, factors or organizations affecting to business activities and performance (Le et al., 2019; Phan et al., 2019). Business environment is divided into two types including internal business environment and external business environment. In the research, our internal business environment is OC and internal business environment is Supply chain management performance. While internal business environment can be controlled, external business environment cannot. Although internal business environment is essential in business planning and decision-making, but more important thing is that external business environment cannot be controlled by organizers and managers. A business organization is described as an open system interacting with external business environment in the basics of symbiosis (Lemghari et al., 2019). On the other hand, a business organization is benefited from environment and vice versa (Le et al., 2019). Currently, the chemical industry has been suffered to restructure because of globalization, continuous fluctuation of raw material price, and closer regulations of the competent authorities. Such challenges require chemical companies to continuously innovate, increase business acumen, and grasp opportunities for development. To do so, chemical companies are required to establish a complete supply chain, both meeting production requirements with minimum cost and ensure maximum safety and environmental rules. Therefore, CE will increase supply chain management performance, help a corporate increase business acumen to the environment resulting in improvement of business performance of a corporate.

H<sub>5</sub>: Supply chain management performance has mediating role in the relationship between CE and BP.

#### *2.5. Mediating role of Size*

Large size companies with long-term business performance nearly completed code of conduct, established specific and unique corporate culture and became competitive advantage of such companies. At the moment, any corporate play an important role in supply chain of the industry. Then, CE activities make OC work more effectively and make BP increase significantly by operating leverage of larger companies. In contrast, with small and medium sized companies, especially newly established companies, establishment of organizational culture need more time and participation of global supply chain of such companies is limited. Therefore, it is difficult for a corporate with CE to attract capital called from “angel investors” and increase immediately business performance. Therefore,

H<sub>6</sub>: Size has moderating role in the relationship between CE and BP.

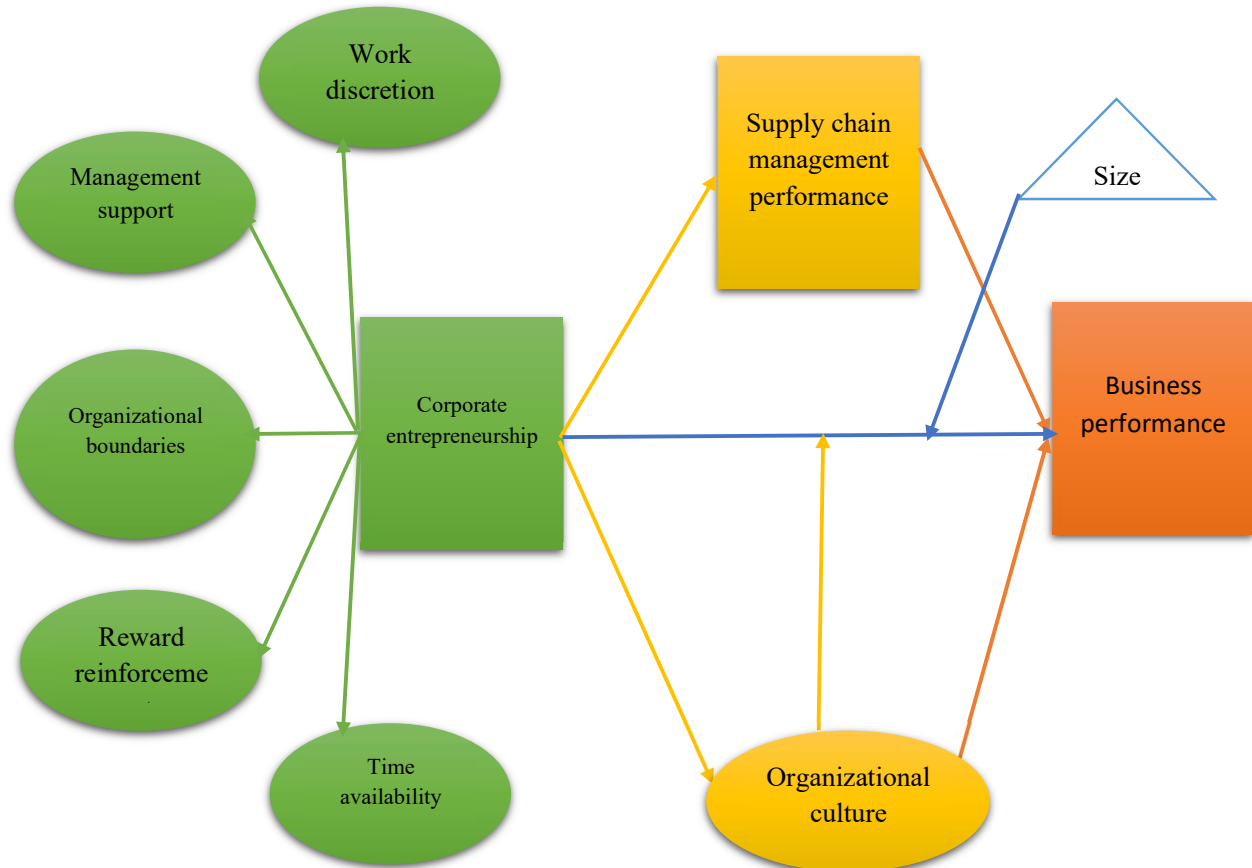
### **3. Methodology**

#### *3.1. Sample*

Research sample includes 100 chemical companies in Vietnam with full information of director, address, business status in website <http://vtown.vn/category16/genre1503.html>. Although, sample size is small but it covers most of the firms. Survey are sent via email, post office in an envelope with

postage stamp for return to 100 companies. Within the first 3 weeks, we collected 36 surveys, then we made a phone call to each company and asked them to complete the survey. After 3 weeks, we collected 58 more surveys and the remaining 6 surveys was supported by Chemical Association of Vietnam via email and phone call for collection, finally after 1 more week, we collected these 6 surveys. 100 collected surveys were classified and removed if some of them were incomplete. During the process, 4 invalid surveys were removed and only data in 96 surveys were analyzed. Result of t-tests on independent sample have shown that there was no significant difference between the responses received sooner or later based on CE, OC and BP.

### 3.2. Model Research



**Fig.1.** Model Research

#### *Corporate entrepreneurship*

Entrepreneurship includes policy activities of a corporate in relation to innovation, creation, risk tolerance, etc. to bring better economic benefits for the future. To measure CE, we use 48 items developed from research of Umrani and Mahmood (2015) measured in 5 aspects: Work discretion, Management support, Organizational boundaries, Reward reinforcement, Time availability. Therefore, CE is the 2<sup>nd</sup> order factor to be measured through 5 aspects expressing development level of innovation and creation idea and business performance of a corporate. All measuring factors were measured by 5 point Likert scale with from 1 = strongly disagree to 5 = strongly agree. Sample item was: "In my organization, developing one's own ideas was encouraged for the improvement of the firm".

### *Organizational culture*

Culture is a set of values related to a corporate beliefs and behaviors, measured by 18 items developed from Denison et al. (2014) and Denison (2000). All measuring factors were measured by 5 point Likert scale with 1 = strongly disagree to 5 = strongly agree. Sample item was: "Cooperation across different parts of the organization is actively encouraged".

### *Business performance*

Business performance has shown that business the results of a corporate was evaluated through some criteria developed from the research by Ali et al. (2010) based on market share, profitability, etc. All measuring factors were measured by 5 point Likert scale 1 = strongly disagree to 5 = strongly agree. Sample item was: "Over the past 3 years, our market share has exceeded our largest competitors".

### *Supply chain management performance*

Supply chain management performance was measured by 5 development criteria from the research of Holmberg (2000) and Le et al. (2019). Two significant indicators are cost control and guaranteed performance structure. Cost prevention indicator includes domestic and international costs, warehousing cost, detention cost and increase of asset revenue. Reliability index reflects in aspects such as order fulfillment service rate, inventory turnover, safe stocks, inventory obsolescence and the number of product warranty requests. All measuring factors are measured by 5 point Likert scale with 1 = strongly disagree to 5 = strongly agree

### *3.3. Research model and Analytical procedures*

#### *Analytical procedures*

Partial least square (PLS) model is used in present research to test the theoretical model. Reasons for selecting partial least square (PLS) model are as follows: First, partial least square (PLS) model has been popular among management sector and related sectors (Hair et al., 2012; Kura, 2016; Kura et al., 2015; Real et al., 2014; Jose & Manuel, 2012). Second, since the purpose of the research is prediction of dependent variable, partial least square (PLS) model is considered as appropriate analysis process (Hair et al., 2011). Thereby, SmartPLS 3.0 software is used in the research. The research used partial least square (PLS) model to analyze data in the fact that this method is widely applied in academic research (Hair et al., 2012; Lee et al., 2011). Before carrying out reliability test, validity and structural path, various assumptions with respect to regularity and polymorphism, common method deviations were evaluated (Hair et al., 2010). A process of two steps was used in the research, including: (1) assessment of measurement model; and (2) assessment of structural model, to assess and report PLS-SEM report (Hair et al., 2010, 2014; Henseler et al., 2009). Measurement model assessment according to Hair et al. (2010, 2014) and Henseler et al. (2009) was carried out to assess measurement model; researchers needed to identify the reliability of each item and internal consistency, content validity, convergent validity and discriminant validity. Reliability of each latent variable should be assessed by considering external load of each measuring factor of each latent variable (Hair et al., 2012, 2014). Researchers gave a rule of thumb to retain the variables for which Cronbach Alpha values are  $> 0.70$  (Hair et al., 2014). External load of each latent variable of the research  $> 0.5$ . Assessment of convergent validity and average variance extracted (AVE) is proposed by Fornell and Larcker (1981). However, according to Chin (1998, 2010), Chin et al. (2003) and Esposito Vinzi et al. (2010), AVE greater than 0.5 expresses convergent validity of specific latent variable. Differentiation value is assessed according to criteria of Fornell and Larcker (1981). According to normal principle, Fornell and Larcker proposed to use AVE with value  $> 0.5$ . However, in order to determine validity of differentiation value, square roots of AVE must be higher than the relationship between latent variables.

Assessment of structural model: Standard bootstrapping process has been used in the research with 500 bootstrap samples to determine importance of path coefficients after Hair et al. (2011, 2012, 2014) and Henseler et al. (2009). Variance evaluation is explained in endogen latent variable. Assessment of

structural model PLS-SEM proposed another important criterium; it is evaluation of  $R^2$  value, known as coefficient of determination (Hair et al., 2011, 2012; Henseler et al., 2009). According to different scholars,  $R^2$  value shows proportion of variation of dependent variable(s) that can be explained by one or many predictions (Hair et al., 2006, 2010; Elliott & Woodward, 2007). According Hair et al. (2010),  $R^2$  value is accepted based on the context of specific location of research. However, according to Falk and Miller (1992),  $R^2$  value of 0.10 is acceptable. Accordingly, Chin (1998) proposed that in PLS-SEM,  $R^2$  value is 0.60 that can be considered as significant, 0.33 as medium and 0.19 as weak.

Prediction is appropriate with model. Nature of variables in the research model is reflective construct, cross confirmation and provision measures were used in the research ( $Q^2$ ) to evaluate appropriate prediction level of model (Hair et al., 2013). Appropriate prediction level is an additional evaluation as recommended due to the fact that goodness for fit (GoF) is not appropriate to verify model because it is an integral part of valid and invalid models (Hair et al., 2014; Henseler & Sarstedt, 2013). Henseler et al. (2009) said that in a research model, if  $Q^2$  value found is higher than 0, the research model is appropriate with research data and research prediction. Values 0.02, 0.15 and 0.35 are considered as weak, medium, strong moderating role, respectively (Cohen, 2013; Henseler & Fassott, 2010).

#### 4. Research result

Table 1 demonstrates the results of Cronbach's Alpha, Composite Reliability and Average Variance Extracted (AVE). As we can observe from the results of Table 1, all components are within the desirable levels.

**Table 1**  
Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Business performance	0.949	0.950	0.949	0.650
Corporate entrepreneurship	0.980	0.980	0.980	0.664
Management support	0.872	0.873	0.872	0.695
Organizational boundaries	0.911	0.911	0.911	0.672
Organizational culture	0.920	0.920	0.920	0.697
Reward reinforcement	0.928	0.928	0.928	0.682
Supply chain management performance	0.945	0.947	0.944	0.773
Time availability	0.898	0.898	0.898	0.638
Work discretion	0.910	0.911	0.910	0.629

**Table 2**  
Discriminant Validity, Fornell-Larcker Criterion

	Business performance	Corporate entrepreneurship	Management support	Organizational boundaries	Organizational culture	Reward reinforcement	Supply chain management performance	Time availability	Work discretion
Business performance	<b>0.806</b>								
Corporate entrepreneurship	0.398	<b>0.815</b>							
Management support	0.363	0.091	<b>0.834</b>						
Organizational boundaries	0.394	0.019	0.189	<b>0.820</b>					
Organizational culture	0.514	0.467	0.496	0.450	<b>0.835</b>				
Reward reinforcement	0.398	0.017	0.231	0.288	0.461	<b>0.826</b>			
Supply chain management performance	0.340	0.180	0.155	0.164	0.236	0.204	<b>0.879</b>		
Time availability	0.432	0.037	0.181	0.009	0.470	0.026	0.193	<b>0.799</b>	
Work discretion	0.395	0.040	0.292	0.020	0.474	0.030	0.172	0.049	<b>0.793</b>

The results of Table 2 show that square roots of AVE are satisfied and greater than correlation between factors. Accordingly, it satisfies conditions to perform bootstrap analysis as follows:

Result of  $R^2$  of BP is 0.32, which means that latent variable in model explains 32% of BP variability. This is a good result.  $f^2$  value = 0.0212 and  $Q^2 > 0$ . It means that the model is meaningful and appropriate with research data. Bootstrapping result is as follows:

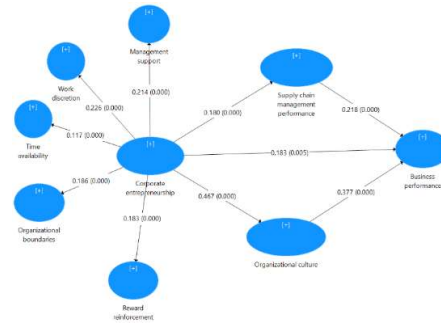


Fig. 2. Bootstrapping result out

From the result in Fig. 2, CE significantly impacted the BP in general SEM model with an average impact coefficient of 0.183 at 1% significance level (P-value = 0.000). It means that the hypothesis H<sub>1</sub> is accepted. Simultaneously, CE significantly impacted to SCMP at weak level with impact coefficient of 0.180 at 1% significance level (P-value = 0.000), and SCMP significantly impacted at strong level to BP with impact coefficient of 0.218 at 1% significance level (P-value = 0.000). It means that SCMP is fully satisfied to verify moderating role (Hair et al., 2014). However, in general SEM model, CE still significantly and statistically impacted to BP, which means that SCMP did not play moderating role in the relationship between CE and BP, therefore the hypothesis H<sub>5</sub> is not accepted. Completely similar to, although CE impacted vastly to OC with impact coefficient up to 0.467 at 1% significance level (P-value = 0.000) and OC impacted vastly to BP with impact coefficient of 0.377 at 1% significance level (P-value = 0.000), therefore the hypothesis H<sub>2</sub> is accepted, but CE still statistically impacted to BP, accordingly, OC has no moderating role in the relationship between CE and BP or the hypothesis H<sub>3</sub> is rejected. Table 3 presents the summary of the results.

Table 3  
Path Coefficients  
Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Corporate entrepreneurship → Business performance	0.183	0.185	0.065	2.804	0.005
Corporate entrepreneurship → Management support	0.991	0.990	0.014	71.002	0.000
Corporate entrepreneurship → Organizational boundaries	1.019	1.018	0.014	73.092	0.000
Corporate entrepreneurship → Organizational culture	0.467	0.468	0.042	11.120	0.000
Corporate entrepreneurship → Reward reinforcement	1.017	1.016	0.007	138.084	0.000
Corporate entrepreneurship → Supply chain management performance	0.180	0.177	0.051	3.532	0.000
Corporate entrepreneurship → Time availability	1.037	1.036	0.007	143.865	0.000
Corporate entrepreneurship → Work discretion	1.040	1.039	0.007	148.945	0.000
Organizational culture → Business performance	0.377	0.376	0.060	6.293	0.000
Supply chain management performance → Business performance	0.218	0.217	0.050	4.353	0.000

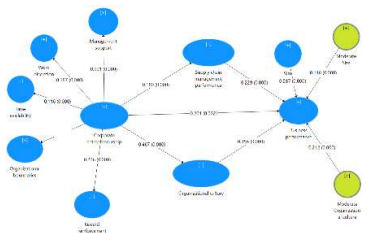


Fig. 3. Result of moderating role test

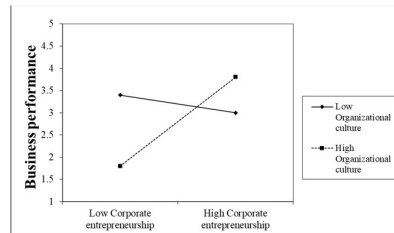


Fig. 4. Moderating role of OC

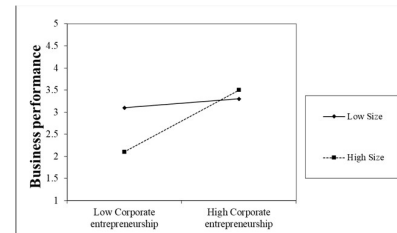


Fig. 5. Moderating role of Size

To test hypotheses H<sub>4</sub> and H<sub>6</sub>, we test moderating role of Size and OC. Bootstrapping result in Fig. 3 shows that, Size has statistically moderating role in the relationship between CE and BP with impact coefficient of 0.116 at average level (Henseler & Fassott, 2010) at 1% significance level (P-value = 0.000). In addition, OC has quite significant moderating role in the relationship between CE and BP with impact coefficient of 0.212 (Henseler & Fassott, 2010) at 1% significance level. Fig. 4 shows that the more OC in Vietnam chemical companies, the much more impact of CE to BP, expressing by dashed line upward and very gradient. In contrast, the worse OC in companies, the worse OC resulting in bad business performance. It means that companies do with poor OC system will make business performance worse when implementing CE due to lack of collective engagement and confidence of stakeholders as well as capital resources of “angel investors”, therefore it the performance becomes worse. The result of Fig. 5 shows that, the bigger the size of a company, the higher the impact of CE to BP, which means that if Vietnam chemical companies have large size, EC will facilitate much improvement of BP. However, when the size is smaller, there is a less relationship but it is not reversed as moderating role of OC. It means that with small-size companies, CE still significantly impacted to BP because at the moment, companies have not controlled by OC yet.

## 5. Conclusion

The chemical industry in Vietnam was established in a large size in 1954. Characteristics of the industry include variety of products serving for all industries in relationship with technical economics. Thereby, the chemical industry can exploit all advantages and resources of land and water, from minerals, petroleum to products, by-products and even industrial and agricultural wastes. Renovation and economic reforms in Vietnam increased economic growth, as well as development of industry - agriculture. Demands for consumption of chemical materials are increasing with chemical production growth rate of 15% annually. The economic growth by the role of chemical industry increased waste and generated more toxic waste. The situation remarkably impacted to the environment. Vietnam is suffered from environmental damages at high level that is tended to increase. There is a lack of safe equipment provided in chemical production lines. Cleaner production technology in chemical production has not been widely applied yet. Some toxic chemicals in production lines have not been replaced. Waste treatment system has not been sufficiently provided in production facilities. In general, the chemical industry has been out of date with low labor productivity. Some basic section such as: petrochemistry and organic chemistry have not been basically established or started. There is an insufficient capacity in the chemical industry to meet demands of other economic sectors. Many essential products of the chemical industry such as: soda, plastics, synthetic fabrics or dyes in Vietnam have not yet been produced yet. Most materials used for production sectors are imported. Therefore, renovation is very essential. Previous researches have shown that there was a positive relationship between CE and BP, the current research argues that this relationship may also depend on other factors such as moderating factors of CE to BP. Therefore, OC and Size - two moderating variables in the relationship between CE and BP are combined and tested in the research. Therefore, major contribution of the current research is found that OC and Size play statistically moderating role in the relationship between CE and BP. Then, all employees of chemical companies should share culture characterized by empowerment, coordination and integration, capacity development and teamwork; At that time, Vietnam chemical companies are able to get competitive advantages and outstanding performance. Hence, Vietnam chemical companies should focus on establishment of CE, OC to improve SCMP and BP leading to sustainable development in the context of intensive integration.

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