A STRUCTURAL EQUATION MODEL OF FACTORS INFLUENCING SUSTAINABILITY OF CHEMICAL INDUSTRY IN THAILAND

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ABSTRACT

Objective: The purpose of the study is to study a structural equation model of factors influencing the sustainability of the chemical industry in Thailand and to study the direct, indirect, and combined influence of factors on the sustainability of the chemical industry in Thailand.

Method: A total of 317 responses were collected from the chemical industry in Thailand using a multi-stage sampling technique. In the relationship analysis among the variables, AMOS is the main program to use, and another is Pearson’s correlation coefficient. The factors of the structural equation model as basic data.

Results: We found that the factors influencing sustainability the most were Transformational Leadership, followed by organizational culture, and corporate social responsibility. The factors that had the most influence on corporate social responsibility were transformational leadership, followed by organizational culture. Transformational leadership must dedicate and foster the organizational culture and corporate social responsibility to address obstacles.

Conclusion: It is important for the organization to define long-term vision and strategies, clear missions, and objectives related to corporate social responsibility, and to provide goals and direction to employees. Therefore, the chemical industry needs a leader who uses the transformational leadership style by shifting the organizational culture to a solid culture to differentiate itself when incorporating corporate social responsibility. Different from previous research on sustainability, this research aims to create a model showing the linkage of three independent latent variables influencing the sustainability of the chemical industry in Thailand.

Keywords: sustainability, transformational leadership, organizational culture, corporate social responsibility.

Received: 26/06/2023
Accepted: 22/09/2023
DOI: https://doi.org/10.55908/sdgs.v11i8.566
UM MODELO DE EQUAÇÃO ESTRUTURAL DE FATORES QUE INFLUENCIAM A SUSTENTABILIDADE DA INDÚSTRIA QUÍMICA NA TAILÂNDIA

RESUMO

Objetivo: O objetivo do estudo é estudar um modelo de equação estrutural de fatores que influenciam a sustentabilidade da indústria química na Tailândia e estudar a influência direta, indireta e combinada de fatores na sustentabilidade da indústria química na Tailândia.

Método: Foram coletadas 317 respostas da indústria química da Tailândia utilizando uma técnica de amostragem em várias etapas. Na análise de relacionamento entre as variáveis, o AMOS é o principal programa a ser usado, e outro é o coeficiente de correlação de Pearson. Os fatores do modelo de equação estrutural como dados básicos.

Resultados: Descobrimos que os fatores que mais influenciaram a sustentabilidade foram a Liderança Transformacional, seguida pela cultura organizacional e a responsabilidade social corporativa. Os fatores que tiveram maior influência na responsabilidade social corporativa foram a liderança transformacional, seguida pela cultura organizacional. A liderança transformacional deve dedicar e promover a cultura organizacional e a responsabilidade social corporativa para enfrentar os obstáculos.

Conclusão: É importante que a organização defina visão e estratégias de longo prazo, missões claras e objetivos relacionados à responsabilidade social corporativa, e forneça metas e direção aos funcionários. Portanto, a indústria química precisa de um líder que use o estilo de liderança transformacional, deslocando a cultura organizacional para uma cultura sólida para se diferenciar ao incorporar a responsabilidade social corporativa. Diferentemente de pesquisas anteriores sobre sustentabilidade, esta pesquisa visa criar um modelo que mostre a ligação de três variáveis latentes independentes que influenciam a sustentabilidade da indústria química na Tailândia.

Palavras-chave: sustentabilidade, liderança transformacional, cultura organizacional, responsabilidade social corporativa.

1 INTRODUCTION

Sustainability is now the primary business objective for every organization which aims to achieve and maintain the business position of the organization. (Meher & Hamato, 2022). Due to changing business environment and global competition, business sustainability has therefore become more of an industrial focus. This can be seen from the fact that many business organizations are interested in obtaining accreditation in areas such as ISO14001, ISO50001, and OHSAS18001. However, creating the proper long-term business sustainability should yield sustained profits for shareholders in conjunction with responding to the social and environmental interests of other business stakeholders (Moaaz, 2017) Firms that do not consider the impact of their decisions on all their stakeholders see reduced sales and profits. Profit maximization is not the only measure of success. A one-dimensional bottom line, profit, will not suffice, the larger
socioeconomic systems beyond the firm demand more. One way to think of sustainability is to consider the systems necessary to support the triple bottom line of the three Ps: people, planet, and profit (Heizer et al., 2016); (Dhote & Zahoor, 2017); (Premi et al., 2021)

The Triple Bottom Line enables businesses to validate both social and environmental outcomes without conflicting with economic results. Hence, this concept is widely accepted. As it demonstrates a transparent vision, policy, and operational approach (Kitkamolwat, 2018). The effective and successful implementation of the TBL concept measures corporate sustainability is possible. If the top management has the characteristics of the “Transformational Leadership” paradigm. Insight, attitude, and talent to create value for all business stakeholders. It is also believed that the eco-friendliness and sustainability of an organization's business are inextricably linked (Moaaz, 2017).

The chemical industry is one of the most important industries of the economy in Thailand. As a result of the epidemic situation of COVID-19 virus resulted in the slowing down of the industry. This causes the demand in both domestic and international markets to decline (Ministry of Industry, 2021).

The chemical industry is operating within the community living area because that community is the customer of the product that is created. Although the main customers of the company are other chemical companies the endpoint of all chemical products is the whole community. So chemical companies only produce products that people need. Demand can arise in one or both ways: The usability of the user is increasing, and the products of the competitor are none. This requirement is applicable to every organization and will be even better if advertising is involved or by increasing influence in society or the world. The driving force behind manufacturing enterprises is profits, whose profits are theoretically limited by competition between manufacturing companies. We could say that part of this cheap price and profit comes from the environmental losses. Pollution and loss of nature and the impact of the chemical industry are also part. Although it is a minority that eliminating or solving pollution problems has an influence on the work of engineers, that is, it makes work more difficult, prevention is very necessary for the safety and happiness of every life (Industry, 2013).

The above data illustrate the economic, social, and environmental problems and obstacles to operating in the chemical industry in Thailand. Therefore, it is necessary to
study the factors influencing the sustainability of the chemical industry in Thailand. Moreover, at present, there is not much research to study on this issue. Of all the importance mentioned above. Therefore, the researcher is of great interest in studying “A Structural Equation Model of Factors Influencing Sustainability of Chemical Industry in Thailand”. The researcher has formulated the following research questions.

1. What are the factors that influence the sustainability of the chemical industry in Thailand?
2. What are the impacts of direct, indirect, and combined influences of factors on the sustainability of the chemical industry in Thailand?

2 LITERATURE REVIEW

In 1987, United Nations’ World Commission on Environment and Development (Nations, 1987) published a report entitled “Our Common Future” giving the concept of sustainable development for the first time. It defines sustainable development as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (Singh et al., 2018); (Severo & De Guimarães, 2022).

Triple Bottom Line is a business accounting term introduced by (Elkington, 1994) using abbreviations such as TBL, 3BL, 3Ps (People, Profit, Planet), and Three Pillars. The term Triple Bottom Line differs from traditional accounting terminology. Traditionally used to represent profit or loss, Elkington intends for TBL to support its goals of holistic sustainability in its businesses in a broader context. This means that companies should be responsible for economic, social, and environmental performance (Bedaduri & Pradhan, 2023). Swink (2020) Profit is one of the top priorities for operations managers and business organizations. In the past, profit was critically important to an organization's long-term sustainability. Regardless of how lofty corporate ambitions are, it cannot survive without consistent profitability, and maintaining profit can be difficult in a rapidly changing environment. The second element of TBL is focused on people. Especially on human rights, health, safety, and quality of life in the community. This includes the stakeholders of a business enterprise, that is, customers, employees, suppliers, and investors. In addition, doing business can have an indirect effect on larger communities and society as a whole. Environmental sustainability involves more than reducing air or water pollution according to the definition provided by the United Nations
Brundtland Commission above. With the growth of the world population and the increasing economic development, there is a greater demand for resources including metals, petroleum, and natural gas. The more people today use it, the less there will be left to future generations.

Burns (1978) first introduced the idea of transforming leadership in descriptive research on political leaders, but now this term is also used in organizational psychology. (Purwanto, Ate & Ifa, 2023). Burns said that transforming leadership was a process. "Leaders and followers help each other to reach higher levels of morale and motivation." Another researcher, (Nations, 1987) expanded on (Burns, 1978) by describing the psychological mechanisms underlying transforming and transactional leadership. Bass also used the term "transformational" instead of "transforming." Bass added to the initial concepts of (Burns, 1978) to help explain how transformational leadership could include how it affects followers' motivation and performance. Leaders' academics and practitioners suggest that organizations today need leadership that inspires followers and empowers them to make revolutionary changes. Transformational CEOs from businesses and non-profits have been credited with dramatic organizational change and have also been praised. Transformational leadership consists of three factors: charisma and inspiration, intellectual stimulation, and individual consideration which when combined will enable leaders to achieve broad change (Nahavandi, 2015).

Organizational Culture is defined as a system in which there is a common background, norms, values, or beliefs among the members of the group and the organization's climate is related to the members' personal reactions to the organization (Edgar H. Schein, 1985). Later, (Schein, 1996) stated that organizational culture which is sometimes called corporate culture is defined as a shared set of implicit assumptions that implicitly assume that a group exists and that determine how the group perceives, thinks, and responds to its environment. (Lewis, 2007) have stated that culture guides behavior and gives meaning to members of the organization. Therefore, it has a direct and powerful influence on what the organization does and what the people in the organization do. Organizational culture is shared beliefs, values, and norms. It connects people together and helps them understand the systems within the organization. The beliefs, values, and norms tell people that. The "how to do it" and "how to do it" culture develops within the organization as people interact and share ways of managing and coping. (Gareth Jones, 2019) define a set of beliefs, expectations, values, norms, and collaborative routines that
influence how members of an organization interact with each other and work together to achieve organizational goals. (Garman, 2006) have stated that the Competitive Values Framework (CVF) is a practical guide for managers to understand, measure, and transform organizational culture. The CVF is reviewed by extensive research involving 1,100 companies. Organizational culture is broken down into four categories: (1) clan, (2) adhocracy, (3) market, and (4) hierarchy.

Lewis (2007) have stated that Corporate social responsibility is a complex concept that goes against precise definitions. In general, Corporate social responsibility can be considered as the interaction between a business and the existing social environment. (Kang & Sivadas, 2018); (Madaan, Kaur, Gowda, Gujarati & Uygun, 2023) More specifically, it refers to the obligations that the organization must perform in a way that is socially beneficial. Most would agree that every organization should operate in a socially responsible manner. However, stakeholders typically expect greater responsibility on the part of organizations, and managers’ own personal ethics are likely to set higher standards too. According to University of Georgia business scholar Archie B. Carroll, corporate social responsibility lies at the peak of the pyramid of corporate obligations, which lies on top of it with economic, legal, and ethical obligations. Some may regard a company's first and only function as profitability. However, (Carroll, 2004) suggests that corporate responsibilities in the global economy should be prioritized as follows: Economic Responsibility is the production of goods and services that society needs at a price that keeps the business alive and fulfills its obligations to investors. Legal Responsibility must comply with applicable local, state, federal, and international laws. Ethical Responsibility, including meeting other social expectations, is not written into the law (Bateman & Snell, 2019). Philanthropic Responsibilities are the additional behavior and activities that society deems desirable and the values of the business support. (Saju & Rajan, 2014).

From the research and literature review, the researcher synthesized the relevant concepts and theories and analyzed the relation between the variables related to the research objective. As a result, the conceptual framework was obtained, as shown in Figure 1.
3 METHODOLOGY

The study aimed to develop a structural equation model for the factors influencing the sustainability of the chemical industry in Thailand from October to December 2022. The quantitative method is applied for this research methodology by using AMOS as statistical software. The descriptive statistics were analyzed and analyzed with a Structural Equation Model (SEM), and the results were then discussed, summarized, and suggested further from the research.

3.1 POPULATION

The population in this research study is the top management of the chemical industry in Thailand in the downstream chemical industry. The downstream chemical industry in Thailand has a total of 2,573 factories, divided into 5 industrial groups as follows (Ministry of Industry, 2021): 1) The chemical fertilizer industry, 2) The chemical or other chemical materials industry, 3) The pharmaceutical industry, 4) The Cosmetic industry, and 5) The paint industry and its associated products. The sampling method used in quantitative research aims to provide a representative sample of the target population. In this research, the target population is the top management of the downstream chemical industry in Thailand. The samples were obtained by the multi-stage sampling of 317
3.2 RESEARCH VARIABLES

This research consists of 4 latent variables: one exogenous latent variable consists of Transformational Leadership, two mediator/intervening variables consist of Organizational Culture and Corporate Social Responsibility, and one endogenous latent variable consists of Sustainability. The observed variables for the 4 latent variables indicate a total of 14 observed variables.

3.3 RESEARCH INSTRUMENT

As the research structure, the questionnaires are developed based on the relevant theories, literature, concepts, and research to the variable set for Transformational Leadership, Organizational Culture, and Corporate Social Responsibility influencing Sustainability which is divided into 3 parts as the following:

Part 1: Personal data of the respondents such as gender, age, highest education, management position, management experience, industrial groups, and business operation period. Nominal and ratio scales are applied.

Part 2: Questions about the latent variables in the research
1. Question about “Sustainability” is developed from previous studies. Ratio and Interval scales are applied, and the scale is classified into 5 levels.
2. Question about “Transformational Leadership” is developed from previous studies. Ratio and Interval scales are applied, and the scale is classified into 5 levels.
3. Question about “Organizational Culture” is developed from previous studies. Ratio and Interval scales are applied, and the scale is classified into 5 levels.
4. Question about “Corporate Social Responsibility” is developed from previous studies. Ratio and Interval scales are applied, and the scale is classified into 5 levels.

Part 3: Suggestion of respondents.

3.4 INSTRUMENT QUALITY INSPECTION

1. Content validity testing by using questionnaires developed by the researcher and presenting them to five experts to check the IOC confidence and the
consistency between the research questions and specified objectives by the researcher and consistent with the problems of research between 0.5-1.

2. Reliability Testing: The researchers measured the reliability by computerizing Cronbach's alpha coefficient (Cronbach, 1949).

3.5 DATA ANALYSIS

As the completed questionnaires, the researcher has to examine the basic data for compliance with the analysis agreement. For the statistical testing, the level of significance and acceptable error (α) is 0.05. The procedure and statistics for analysis are as below.

1. The basics of statistical analysis of sample distribution by using descriptive statistics, i.e. percentage, mean, and the basic statistical analysis for developing the model. This research consisted of 14 observed variables for acknowledging the distribution and variation of the structural equation model.

2. In the relationship analysis among the variables, AMOS is the main program to use, and another, is Pearson’s correlation coefficient. The factors of the structural equation model as basic data.

4 RESULTS

4.1 SAMPLE CHARACTERISTICS

The results of the analysis of general data of 317 respondents in the gender samples. Most were 240 males, representing 75.71%, 77 females, representing 24.29%, mostly aged 41-50 years old, and 107 respondents, representing 33.76%. From the highest education, a bachelor’s degree is a greater number of respondents for 185 respondents, representing 58.36%. Most of them have management positions as managers of 194 respondents, representing 61.20%. The management experience of 5 - 10 years, 132 respondents, representing 41.64%. Most of the respondents came from the chemical fertilizer industry, with 92 respondents, representing 29.02%, the business has the most operating period of 11-20 years, with 141 respondents, representing 44.48%.
The results of the analysis can be summarized as shown in Figure 2. The Structural Equation Model (SEM) of the model of factors influencing the sustainability of the chemical industry in Thailand. The variables in the analysis included sustainability, transformational leadership, organizational culture, and corporate social responsibility. The researcher examined the suitability and correctness of the structural equation model and adjusted the model to be perfect so that the statistical values were accepted by the variable link method (Modification Indices). The suitability and validity of the structural equation model were also checked by considering the variable weights and the R2 value to verify the covariance of the indicators.

The results of the test analysis of a structural equation model of factors influencing the sustainability of the chemical Industry in Thailand. The variable contains Sustainability, Transformational Leadership, Organizational Culture, and Corporate Social Responsibility aspect including a total of 4 latent variables and 14 observable variables. The results showed that a Factor Loading (λ) between 0.44 – 0.99 is greater than 0.40 and a Multiple Correlation Coefficient (R2) is between 19.0% - 98.0%. When
considering the regression coefficient of the standard score independent variable as a decision coefficient indicating the direct influence of the path, the results of the hypothesis test can be summarized as follows.

Hypothesis 1 (H1): Transformational Leadership has a positive influence on Sustainability: The test result of H1 had a regression coefficient of 0.32, a Standard Error (SE) of 0.07, a t-value of 4.636, and a Sig. of 0.000 < 0.05. It was concluded that the test results accepted the H1, that is, Transformational Leadership had a positive influence on Sustainability. The influence was 63.0% at a statistically significant level of 0.05.

Hypothesis 2 (H2): Transformational Leadership has a positive influence on Organizational Culture: The test result of H2 had a regression coefficient of 0.58, a Standard Error (SE) of 0.06, a t-value of 5.416, and a Sig. of 0.000 < 0.05. It was concluded that the test results accepted the H2, that is, Transformational Leadership had a positive influence on Organizational Culture. The influence was 33.0% at a statistically significant level of 0.05.

Hypothesis 3 (H3): Transformational Leadership has a positive influence on Corporate Social Responsibility: The test result of H3 had a regression coefficient of 0.55, a Standard Error (SE) of 0.05, a t-value of 12.446, and a Sig. of 0.000 < 0.05. It was concluded that the test results accepted the H3, that is, Transformational Leadership had a positive influence on Corporate Social Responsibility. The influence was 77.0% at a statistically significant level of 0.05.

Hypothesis 4 (H4): Organizational Culture has a positive influence on Sustainability: The test result of H4 had a regression coefficient of 0.38, a Standard Error (SE) of 0.17, a t-value of 4.426, and a Sig. of 0.000 < 0.05. It was concluded that the test results accepted the H4, that is, Organizational Culture had a positive influence on Sustainability. The influence was 63.0% at a statistically significant level of 0.05.

Hypothesis 5 (H5): Corporate Social Responsibility has a positive influence on Sustainability: The test result of H5 had a regression coefficient of 0.20, a Standard Error (SE) of 0.07, a t-value of 2.630, and a Sig. of 0.009 < 0.05. It was concluded that the test results accepted the H5, that is, Corporate Social Responsibility had a positive influence on Sustainability. The influence was 63.0% at a statistically significant level of 0.05.
Hypothesis 6 (H6): Organizational Culture has a positive influence on Corporate Social Responsibility: The test result of H6 had a regression coefficient of 0.44, a Standard Error (SE) of 0.17, a t-value of 5.278, and a Sig. of 0.000 < 0.05. It was concluded that the test results accepted the H6, that is, Organizational Culture had a positive influence on Corporate Social Responsibility. The influence was 77.0% at a statistically significant level of 0.05.

Table 1: Influence analysis of Structural Equation Model of Factors Influencing Sustainability of Chemical Industry in Thailand.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Influence</th>
<th>Organizational Culture</th>
<th>Corporate Social Responsibility</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformational and Leadership</td>
<td>Direct</td>
<td>0.58</td>
<td>0.55</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>Indirect</td>
<td>-</td>
<td>0.25</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.58</td>
<td>0.80</td>
<td>0.69</td>
</tr>
<tr>
<td>Organizational Culture</td>
<td>Direct</td>
<td>-</td>
<td>0.43</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>Indirect</td>
<td>-</td>
<td>-</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>-</td>
<td>0.43</td>
<td>0.46</td>
</tr>
<tr>
<td>Corporate Social Responsibility</td>
<td>Direct</td>
<td>-</td>
<td>-</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Indirect</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>0.20</td>
</tr>
<tr>
<td>R²</td>
<td>33.0%</td>
<td>77.0%</td>
<td>63.0%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Prepared by the authors, (2023).

Table 2: Summary of hypothesis testing of Structural Equation Model of Factors Influencing Sustainability of Chemical Industry in Thailand.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Test result</th>
<th>Influence</th>
<th>Coefficient</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 Transformational Leadership has a positive influence on Sustainability</td>
<td>Accept</td>
<td>Direct</td>
<td>0.32</td>
<td>63.0%</td>
</tr>
<tr>
<td>H2 Transformational Leadership has a positive influence on Organizational Culture</td>
<td>Accept</td>
<td>Direct</td>
<td>0.58</td>
<td>33.0%</td>
</tr>
<tr>
<td>H3 Transformational Leadership has a positive influence on Corporate Social Responsibility</td>
<td>Accept</td>
<td>Direct</td>
<td>0.55</td>
<td>77.0%</td>
</tr>
<tr>
<td>H4 Organizational Culture has a positive influence on Sustainability</td>
<td>Accept</td>
<td>Direct</td>
<td>0.38</td>
<td>63.0%</td>
</tr>
<tr>
<td>H5 Corporate Social Responsibility has a positive influence on Sustainability</td>
<td>Accept</td>
<td>Direct</td>
<td>0.20</td>
<td>63.0%</td>
</tr>
<tr>
<td>H6 Organizational Culture has a positive influence on Corporate Social Responsibility</td>
<td>Accept</td>
<td>Direct</td>
<td>0.44</td>
<td>77.0%</td>
</tr>
</tbody>
</table>

* Statistically significant at 0.05
Source: Prepared by the authors, (2023).

The results of the influence analysis of a Structural Equation Model of Factors Influencing Sustainability of Chemical Industry in Thailand, it was concluded that the factors influencing sustainability the most were Transformational Leadership with a total influence coefficient of 0.69, followed by Organizational Culture with a total influence coefficient of 0.46, and Corporate Social Responsibility with a total influence coefficient of 0.20 with a 63.00% influence on change. The factors that had the most influence on
Corporate Social Responsibility were Transformational Leadership with a total influence coefficient of 0.80, followed by Organizational Culture with a total influence coefficient of 0.43, with an influence on change of 77.0%. Transformational Leadership influences Organizational Culture with a total influence coefficient of 0.58, with a 33.0% influence on change.

5 DISCUSSION

In this study, we found that transformational leadership has a positive influence on sustainability consistent with Villca and Castillo (Cabana Villca & Pino Castillo, 2020) that transformational leadership directly and positively influences sustainable management and suggests that retail leaders need programs to communicate and promote strategic frameworks, values, and organizational policies. It is also consistent with (Begum et al., 2020) who found the strategic significance of transformational leadership and its influence on sustainable organizational innovation for SMEs, suggesting that transformational leadership is the main driver of knowledge acquisition to achieve sustainable organizational innovation in SMEs. It shows that transformational leaders must build knowledge and install sustainability among their members for their organization to achieve sustainability. In the current situation, the chemical industry in Thailand faces economic and social changes, especially environmental problems. This pressures executives to be more aware of sustainability and to try to adapt to the changes. However, executives need to be able to lead the organization toward sustainability. It is essential to raise awareness among members of the organization by using effective and sincere communication methods and building trust between management and operators.

Our model empirically shows that transformational leadership has a positive influence on organizational culture and organizational culture has a positive influence on sustainability. This research shows that transformational leadership influences organizational culture building to make organization members aware of sustainability because the right organizational culture leads to sustainability, (Jorge Luis Pena Acevedo, 2021) suggesting that SME leaders should focus on building a strong corporate culture because it will have a positive effect on the performance of the company. And it is also consistent with (Srisathan et al., 2020) demonstrating the significant impact of organizational culture on organizational sustainability in a cultural way that preserves the core competence of businesses in marketing, operations, customer orientation, capital
management, and sustainability monitoring and assessment. We can conclude that leaders need to extend the idea of sustainability into the organizational culture so that members of the organization share the same vision and values. This will lead to the continuation of the organizational culture. Due to the unique nature of the operation of the chemical industry in Thailand that affects society and the environment. As a result, members of the organization are instilled in and realize the importance of their duties. (Ramamurthi et al., 2021). The way leaders embed sustainability into organizational culture is by continually increasing their participation in sustainability activities to reinforce and communicate the need for sustainability. These will result in changes in the thoughts and behaviors of the members of the organization in the way that the organization desires to eventually form an organizational culture.

We also found that transformational leadership has a positive influence on corporate social responsibility and corporate social responsibility has a positive influence on sustainability. This research shows that transformational leadership drives corporate social responsibility in which corporate social responsibility is a factor for sustainability in line with (Ranjit, 2020) shows that TL training in an organization promotes an organization's commitment to CSR activities, thereby improving job performance. It is also in line with (Shahzad et al., 2020) who said the trend is to increase sustainability efficiency through the adoption of CSR practices. Organizations should focus on social responsibility activities to increase corporate sustainability. We can conclude that characteristics of transformational leadership help create more beneficial attitudes toward stakeholders, including charisma and inspiration, intellectual stimulation, and individual consideration. These are more likely to carry out various CSR activities. In addition, the implementation of CSR practices in the operations of the chemical industry not only achieves better efficiency goals and increases market share but also saves energy resources, and reduces emissions and waste, which responds to the concept of sustainability.

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We also found that transformational leadership has a positive influence on corporate social responsibility and corporate social responsibility has a positive influence
on sustainability. This research shows that transformational leadership drives corporate social responsibility in which corporate social responsibility is a factor for sustainability in line with (Ranjit, 2020) shows that TL training in an organization promotes an organization's commitment to CSR activities, thereby improving job performance. It is also in line with (Shahzad et al., 2020) who said the trend is to increase sustainability efficiency through the adoption of CSR practices. Organizations should focus on social responsibility activities to increase corporate sustainability. We can conclude that characteristics of transformational leadership help create more beneficial attitudes toward stakeholders, including charisma and inspiration, intellectual stimulation, and individual consideration. These are more likely to carry out various CSR activities. In addition, the implementation of CSR practices in the operations of the chemical industry not only achieves better efficiency goals and increases market share but also saves energy resources, and reduces emissions and waste, which responds to the concept of sustainability.

Finally, our model empirically shows that corporate culture has a positive influence on corporate social responsibility, consistent with Espasandín-Bustelo, (Jorge Luis Pena Acevedo, 2021), which found that organizational culture influences corporate social responsibility and suggests that managers can play a proactive role in promoting internal CSR by designing organizational culture. This is consistent with previous findings. In short, transformational leadership creates an organizational culture to pass on to members of the organization so that all members share a common vision and values for sustainability. At the same time, transformational leadership creates and supports the organization's corporate social responsibility activities by creating an environment that allows members of the organization to carry out corporate social responsibility activities willingly and with a sense of social responsibility. These things combine to be key factors for organizations to develop sustainability in the long term.

6 CONCLUSION AND SUGGESTION

Sustainability requires building an organization's commitment to sustainability. Therefore, transformational leadership must dedicate and foster the organizational culture and corporate social responsibility to address obstacles. That may be a barrier that may manifest in the design and implementation of the company's corporate architecture. Transformational leadership should strive to make the work environment a place of
encouraging and supportive interaction. These factors can promote confidence-building. In this sense, transformational leadership can create a more cohesive environment for leaders to develop greater commitment to organizational goals.

Additionally, it is important for the organization to define long-term vision and strategies, clear missions, and objectives related to CSR, and to provide objectives and direction to employees. The rationale is that mission building which includes these aspects contributes the most to the integration of CSR activities as compared to other aspects of organizational culture. Therefore, an organization needs to have a leader who uses the transformational leadership style by shifting the organizational culture to a strong culture to differentiate itself when incorporating CSR. Leaders need to realize that, eventually, CSR activities can help capture the market and reduce financial risks. CSR activities also help companies achieve tangible and intangible results of corporate sustainability.
REFERENCES


Cabana Villca, R., & Pino Castillo, C. J. (2020). Sustainable management model to strengthen competitiveness in “Supermarket” retail companies in the region of Coquimbo, Chile. Contaduría y administración, 65(2).


