# ผลกระทบของระเบียบด้านสิ่งแวดล้อมต่อประสิทธิผลขององค์กรภาคธุรกิจภายใต้รูปแบบเศรษฐกิจแนวคิดใหม่ (BCG Economy) ของไทย
# The Impact of Environmental Regulation on Corporate Performance under Thailand's Bio-Circular-Green Economic Model (BCG)

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## บทคัดย่อ

งานวิจัยครั้งนี้ มีจุดมุ่งหมายเพื่อ 1) ศึกษากระบวนการเปลี่ยนแปลงเชิงทฤษฎีและวิจัยสภาพปัจจุบันของผลกระทบของระเบียบด้านสิ่งแวดล้อมต่อประสิทธิภาพขององค์กรภาคธุรกิจภายใต้รูป แบบเศรษฐกิจแนวคิดใหม่ (BCG Economy) ของไทย 2) สร้างรูปแบบจำลองทางทฤษฎีว่าด้วยระเบียบ ด้านสิ่งแวดล้อม กลยุทธ์การแข่งขันขององค์กรภาคธุรกิจ และประสิทธิภาพขององค์กรภาคธุรกิจ 3) ตรวจสอบเพื่อยืนยันมุมมองที่มีพื้นฐาน มาจากการรับมือกลยุทธ์การแข่งขันขององค์กรภาคธุรกิจ และความสัมพันธ์ด้านผลกระทบของระเบียบด้านสิ่งแวดล้อมต่อประสิทธิภาพขององค์กรภาคธุรกิจ 4) เสนอข้อคิดเห็นรูปแบบเศรษฐกิจแนวคิดใหม่ (BCG Economy) ของไทยเป็นกลยุทธ์การแข่งขันและประสิทธิภาพขององค์กร ทำให้ประเทศไทยบรรลุสิ่งแวดล้อมและเศรษฐกิจแบบ “ได้ประโยชน์ร่วมกัน” และส่งเสริมรูปแบบเศรษฐกิจแนวคิดใหม่ไทยไปยังประเทศต่าง ๆ มากขึ้น

ผลวิจัยพบว่า 1) รูปแบบการใช้คำสั่งควบคุมของระเบียบด้านสิ่งแวดล้อม ไม่มีผลกระทบต่อความได้เปรียบในการแข่งขันขององค์กรภาคธุรกิจ 2) รูปแบบแรงจูงใจทางการตลาดและการดำเนินงานด้านระเบียบด้านสิ่งแวดล้อมอย่างเต็มใจ มีผลกระทบเชิงบวกค่อนข้างมากอย่างมีนัยสำคัญต่อความได้เปรียบในการแข่งขันขององค์กรภาคธุรกิจ 3) รูปแบบแรงจูงใจทางการตลาดด้านระเบียบด้านสิ่งแวดล้อม มีผลกระทบทิศทางบวกต่อกลยุทธ์ต้นทุนต่ำสูงมากอย่างมีนัยสำคัญถึงร้อยละ 70.4 และการดำเนินงานด้านระเบียบสิ่งแวดล้อมอย่างเต็มใจต่อกลยุทธ์ความแตกต่างของความได้เปรียบในการแข่งขันขององค์กรภาคธุรกิจ มีผลกระทบทิศทางบวกอย่างมีนัยสำคัญสูงถึงร้อยละ 48.8 และ 4) ความได้เปรียบในการแข่งขันด้านความแตกต่างขององค์กรภาคธุรกิจ ส่งผลกระทบทิศทางบวกชัดเจนอย่างมีนัยสำคัญต่อประสิทธิภาพขององค์กรภาคธุรกิจสูงถึงร้อยละ 56.2 และ 52.8

ยังพบอีกว่า ผลวิจัยเชิงทฤษฎีและผลวิเคราะห์เชิงประจักษ์นี้ นำเสนอสิ่งใหม่ภายใต้รูปแบบเศรษฐกิจแนวคิดใหม่ โดยใช้ระเบียบการควบคุมเศรษฐกิจมหภาคแห่งชาติ และการดำเนินการขององค์กรภาคธุรกิจ เกิดผลกระทบต่อเนื่องคือ 1) นโยบายระเบียบด้านสิ่งแวดล้อมและแผนกลยุทธ์การแข่งขันขององค์กรภาคธุรกิจสมบูรณ์ 2) ประสิทธิภาพนโยบายระเบียบด้านสิ่งแวดล้อมด้วยเศรษฐกิจแนวคิดใหม่ เป็นกลยุทธ์การแข่งขันที่ทำให้องค์กรภาคธุรกิจบรรลุผลลัพธ์ทางการเงิน และ 3) การเผยแพร่ด้านนโยบายระเบียบด้านสิ่งแวดล้อมด้วยเศรษฐกิจแนวคิดใหม่ของประเทศไทยโดยใช้พื้นฐานทางทฤษฎีอย่างมีประสิทธิภาพสร้างแนวทางใหม่ในอนาคตสู่ต่างประเทศ

**คำสำคัญ :** รูปแบบเศรษฐกิจแนวคิดใหม่ (BCG) ระเบียบด้านสิ่งแวดล้อม กลยุทธ์การแข่งขัน และประสิทธิภาพ

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## ABSTRACT

The research objectives of this study are: 1) The theoretical evolution process and research status of the impact of environmental regulation on corporate performance in Thailand's BCG model; 2) To build a theoretical model of environmental regulation, corporate competition strategy and corporate performance. 3) Verify the impact of environmental regulation on corporate performance from the perspective of corporate competitive strategy response; 4) Provide suggestions for Thailand to optimize the BCG model and help companies formulate competitive strategies to improve corporate performance. Ultimately, Thailand will achieve a "win-win" environment and economy, and the Thailand BCG model will be extended to more countries.

The research shows that: 1) the command-and-control environmental regulation has no clear influence on the competitive advantage of enterprises; 2) the market-incentive and voluntary environmental regulation has a significant positive impact on the enterprise's competitive advantage; 3) the market-incentive environmental regulation has a positive effect on the enterprise's competitive advantage The low-cost strategy has a significant positive impact, with a high impact factor of 70.4%. Voluntary environmental regulation has a significant positive impact on the differentiated competitive advantage of enterprises, with an impact factor of 48.8%; 5) No matter what kind of enterprise competitive advantage has a significant positive impact on enterprise performance, the impact factor is 56.2% and 52.8% respectively.

Finally, based on the results of theoretical research and empirical analysis, this paper puts forward suggestions and countermeasures to improve environmental regulation policies and improve corporate competition strategies under the new BCG model from the two levels of national macro-control and enterprise operation, in order to optimize the BCG environment in Thailand. Regulatory policies and enterprises' implementation of competitive strategies to obtain financial performance point out the path, in order to provide a theoretical basis for optimizing Thailand's BCG environmental regulation policy and extending the Thai BCG model to more countries.



**Keywords:** Thailand BCG model, environmental regulation, competitive strategy, corporate performance

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## 1. Introduction

Over the past few decades, Thailand's natural resources have been degraded, economic growth has been slow, the income of most people in the country is still very low, and Thailand has long been caught in the middle-income trap. Therefore, the government needs to improve the ecological environment and accelerate Thailand's development by upgrading Thailand's economic and social development model to a new one. This new model is called the BCG economic model. The BCG economic model will help leverage the country's advantages and generate more value. Production of high-value products and services in terms of biological and cultural diversity through mechanisms that rely on science, technology and innovation. Ultimately, the economic system will be changed from "doing more and getting less" to "doing less and getting more". Through continuous research and improvement, the BCG economic model can help more developing countries get out of the middle-income trap completely.

**Economic Growth and Environmental Impact**

The ecological environment is an important guarantee for human survival and development, and the construction of a good ecological environment is the basic condition for the existence and development of the entire human society. However, in recent years, with the rapid progress of society and the vigorous development of economy, many environmental problems have appeared in the global ecological environment (Steininger and Weckhannemann H., 2002). According to the Living Planet Report 2018, the number of wild animal populations on the planet died out by 60% between 1970 and 2014. In recent decades, the rate of disappearance of species on the planet has accelerated, and the rate of disappearance has increased compared to hundreds of years ago. 100-1000 times. The report also points out that the greatest and most direct impact on biodiversity comes from threats from human activities (Rapport et al., 1998; Anderson and Bausch, 2006).

As the world's new industrial country and one of the world's emerging market economies, Thailand's Twelfth National Economic and Social Development Plan (2017-2021) shows that in recent years, with the rapid progress of Thai society and the booming economy, Its natural resources are constantly decreasing and the ecological environment is constantly degrading (NESDB. 2018: 1-11.) The rapid urbanization of the population has caused the urbanization of the land, which has led to the continuous expansion of the scale of the city, especially in the megacities, such as the Bangkok area, where a series of ecological problems such as reduction of green area, rising urban surface temperature, air pollution, and water pollution are particularly prominent (Arifwidodo and Tanaka 2015); As people cut down trees for farming and occupy public land for their own use, the forest has been destroyed, and the forest coverage in Thailand has been severely reduced.

According to the Sueb Nakhasathien Foundation report, in the early 1860s, 53% of the land in Thailand was covered by forests, but by 2015, the area covered by forests had

been reduced to 31.6% (Entwisle et al., 2008); Thailand's industry continued to develop. As its industry increases, air quality is also declining, and pollution is getting more and more serious, especially in the Bangkok area, where there are a large number of cars and factories, and the exhaust gas emitted by it causes serious pollution to the atmosphere, and the air quality is poor (Ruchirawat et al.2007), according to the World Bank It is estimated that the number of deaths caused by air pollution in Thailand has increased from 31,000 in 1990 to 49,000 in 2013 (World Bank Institute for Health Metrics and Evaluation, 2016).

**Thailand proposes BCG model**

Since the 1990s, the development model of circular economy has been accepted by more and more countries. Under the guidance of sustainable development strategies, many countries have taken the development of circular economy and the establishment of a circular society as an important way to achieve the coordinated development of environment and economy, and have achieved practical results in saving resources, protecting the environment and improving efficiency (Circle Economy, 2019). Since October 2020, with the establishment of two relevant BCG committees, the promotion of the BCG model at the policy level in Thailand has been underway. The two committees include the BCG Policy Council, chaired by the Prime Minister of Thailand; and the BCG Model Implementation Committee, chaired by the Minister of Higher Education, Science, Research and Innovation, and responsible for developing an action plan for implementing the BCG model. From January 2021, the BCG model has been approved as Thailand's national strategy (The Office of National Higher Education Science Research and Innovation Policy Council [NXPO], 2021).

Thailand's BCG model is mainly built on the country's economic foundation and strengths, including four strategic areas, namely food and agriculture; medical and health; energy, materials and biochemistry; tourism and creative economy. Thailand hopes to focus on the above-mentioned areas to achieve comprehensive security in key areas such as food, health, energy, employment and sustainable development of natural resources and the environment. The Thai government plans to restore the country's economy and status through the BCG model, and hopes to extend this model to developing and underdeveloped countries to help them achieve common prosperity (Singlor, 2021).

**The impact of environmental regulation on firm performance**

From January to September 2021, the Board of Investment of Thailand (BOI) has received investment applications worth 128.4 billion baht (about 3.8 billion US dollars), which are classified as Bio-Circular-Green (BCG), accounting for 10% of new applications. quarter. The BOI said the increase in the total number of green development application projects confirmed an upward trend in recent years. From January to September last year, investment applications in the BCG sector amounted to 49.3 billion baht. From 2015 to the third quarter of 2021, BCG investment applications submitted by local and overseas investors totaled 677.2 billion baht. BCG data combines investment applications for projects in various biotechnology

projects, environmentally friendly food production, recycling, clean energy production, bioplastics and biofuels. This fully shows that the BCG model in Thailand is very attractive to enterprises, and has already had an impact on the competitive strategies of related enterprises. Although environmental regulation policy is the most effective way to solve environmental problems, if the use of environmental regulation policy tools lacks effective cost-benefit analysis and fails to make accurate predictions and judgments, it will also cause huge negative losses to the development of enterprises.

As a new environmental regulation policy, the BCG model in Thailand may bring a heavier cost burden to related enterprises. From this perspective, it is not conducive to improving the competitiveness of enterprises. As John von Neumann stated in the book "Game Theory", "economic development and environmental protection are a pair of contradictions, and this contradiction will inevitably lead to environmental pollution". At the same time, SeulgiYoo et al. (2019) studied the panel data of Korean manufacturing enterprises from 2004 to 2015, and also found that compared with less polluting industries, polluting industries will bear a higher cost burden due to environmental regulation policies

However, some scholars believe that appropriate environmental regulation policies will stimulate the innovative behavior of enterprises and improve the efficiency of enterprises' utilization of resources, so that the performance improvement brought by innovation will be higher than the cost increase brought by regulation, and the positive improvement of enterprise performance will be realized. Research on the relationship between environmental regulation and corporate performance has become a hot topic in academia and practice.

The topic of this thesis comes from thinking about the BCG model currently under construction in Thailand. It examines the impact of environmental regulation on corporate performance from the perspective of corporate competitive strategy response, which not only contributes to the implementation of various policies that refine and categorize environmental regulations At the same time, it also provides practical significance for enterprises to reduce the negative impact of environmental regulation on the enterprise itself as much as possible, turn the environmental regulation policy into an advantage, and effectively implement the environmental regulation policy.

In addition, the pursuit of environmental benefits is undoubtedly the main goal of environmental regulation, and the pursuit of corporate performance is the main goal of company development. Based on the perspective of corporate competitive strategy response, this paper focuses on corporate responses to environmental regulation, and discusses the impact of environmental regulation on corporate performance. Influence relationship, so as to make reasonable development plans more targeted and innovative in the case of "win-win" environmental benefits and corporate performance.

**Significance of Research**

From the perspective of corporate competitive strategy response, it is of great research value and significance to study the relationship between environmental regulation and corporate performance, especially in today's environment where the ecological environment is deteriorating, so that environmental protection issues can be effectively improved and managed.

This paper mainly studies and analyzes the relationship between environmental regulation, enterprise competition strategy and enterprise performance, which has strong theoretical and practical significance. details as follows:

(1) Theoretical Significance: To build a model of "Environmental Regulation-Competitive Strategy-Corporate Performance", using the four major industrial enterprises of Food and Agriculture, Medical and Wellness, Energy Material and Biochemical, Tourism and Creative Economy included in the Thai BCG model as research. It makes up for the lack of targeted industry division of environmental regulation analysis in the past. It conducts analysis and research through questionnaire data, and uses structural equations to explore the relationship between environmental regulation, corporate competition strategy and corporate performance, enriching and improving the existing environmental regulations. Theoretical research on regulation.

(2) Practical significance: The questionnaire designed in this study is a 7-level scale, some of which can provide a reference for environmental departments to consider or evaluate the environmental behavior of heavily polluting enterprises. From the government's point of view, the influencing factors obtained from the analysis point out the direction for the government to guide enterprises to strengthen environmental behavior, and are conducive to the further improvement of environmental regulation, and promote the effective improvement and governance of the ecological environment; from the enterprise's point of view, environmental regulation affects business performance. It is helpful to objectively evaluate the implementation effects of different types of environmental regulation policies, provide suggestions for optimizing the implementation of environmental regulation policies, and also provide practical significance for improving corporate performance and interests.

With the improvement of people's understanding of environmental problems and the improvement of environmental protection awareness, environmental policies have also experienced a process from simple to complex. Different types of environmental protection policies have been formulated based on different pollution behaviors, heavy polluting enterprises and industries, etc. Certain theoretical basis and practical significance. Environmental regulation mainly refers to the laws, regulations, standards, etc. related to environmental protection, pollution control and emission reduction formulated by the national administrative department according to the actual situation of different enterprises

to compulsorily regulate the behavior of enterprises, so as to achieve the impact on the production process of enterprises. The purpose of restricting the discharge of pollutants and other acts and protecting the environment. Although environmental regulation policy is the most effective way to solve environmental problems, if the use of environmental regulation policy tools lacks effective cost-benefit analysis and fails to make accurate predictions and judgments, it will also cause huge negative losses to the development of enterprises.

From a practical point of view, the harmonious coexistence of man and nature is the cornerstone of social development and an inevitable requirement of modernization. The topic of this thesis comes from thinking about the BCG model currently under construction in Thailand. It examines the impact of environmental regulation on corporate performance from the perspective of corporate competitive strategy response, which not only contributes to the implementation of various policies that refine and categorize environmental regulations At the same time, it also provides practical significance for enterprises to reduce the negative impact of environmental regulation on the enterprise itself as much as possible, turn the environmental regulation policy into an advantage, and effectively implement the environmental regulation policy.

In addition, the pursuit of environmental benefits is undoubtedly the main goal of environmental regulation, and the pursuit of corporate performance is the main goal of company development. Based on the perspective of corporate competitive strategy response, this paper focuses on corporate responses to environmental regulation, and discusses the impact of environmental regulation on corporate performance. Influence relationship, so as to make reasonable development plans more targeted and innovative in the case of "win-win" environmental benefits and corporate performance

## Research Objectives

According to the model of "Environmental Regulation-Competitive Strategy-Enterprise Performance", this paper uses accounting, regulatory economics, management and other related theories to analyze the relationship between the three variables, and uses Thailand's data to conduct empirical research, and finally obtains Draw research conclusions and suggest countermeasures.

(1) To study the theoretical evolution process and research status of the impact of environmental regulation on corporate performance in Thailand's BCG model.

(2) To build a theoretical model of environmental regulation, corporate competition strategy and corporate performance.

(3) To verify the impact of environmental regulation on corporate performance from the perspective of corporate competitive strategy response.

(4) To provide suggestions for Thailand to optimize the BCG model and help companies formulate competitive strategies to improve corporate performance.

## 2. Literature Review

### 2.1 Thailand's BCG Economy

Bio-Circular-Green Economy (BCG) is an economic model that can more effectively use natural assets while minimizing the impact on the environment. The BCG model adopts a socially integrated approach, that is, the joint participation of the government, the private sector, academia, and society, which will ultimately enable Thailand to re-enter the path of building a healthier, more environmentally friendly and more inclusive economy after the epidemic subsides.

#### 2.1.1 Road to BCG Model

Since October 2020, with the establishment of two related BCG committees, Thailand has begun to promote the BCG model at the policy level. The two committees include the BCG Policy Council headed by the Prime Minister of Thailand; and the BCG Model Implementation Committee chaired by the Minister of Higher Education, Science, Research and Innovation, which is responsible for formulating an action plan to implement the BCG model. Since January 2021, the BCG model has been approved as Thailand's national strategy. Thailand's BCG model is mainly based on the country's economic foundation and advantages, including four strategic areas, namely food and agriculture; medical and health; energy, materials and biochemistry; tourism and creative economy. Thailand hopes to focus on the above-mentioned areas to achieve comprehensive security guarantees in key areas such as food, health, energy, employment, natural resources and environmental sustainability.

The BCG model also seeks to make full use of Thailand's biodiversity advantages in the entire supply chain by improving community capabilities and optimizing the use of new technologies. At the same time, in the upstream of the supply chain, scientific research institutions are also promoting the transformation of manufacturing and service industries through modern scientific methods and technologies and local innovation. The BCG model also hopes to promote the common development of bio-economy, circular economy and green economy at the same time. In short, Thailand plans to adopt innovative and environmentally friendly development models to achieve better benefits.

Although the concepts of bio-economy, circular economy, and green economy are not new in Thailand, the BCG model of jointly implementing the three in a coordinated manner is unprecedented. Thailand has always advocated a number of development concepts and models. These concepts and models actually complement each other, that is, to achieve a balance between the protection of natural resources and the creation of value. The BCG model is the latest development model, which is outlined after analyzing the current situation in Thailand and the priority goals that Thailand will complete in the course of its development.

#### 2.1.2 Enhancing Infrastructure and Capacity Building

"The BCG development model is based on the principles of the Sufficient Economic Philosophy (SEP) of King Bhumibol Adulyadej, King Rama IX of Thailand, and is

particularly closely related to the concept of moderate development mentioned in it. Economic development should start from the use of Existing resources and strengthening of infrastructure began, and developed in the direction of achieving a balanced, stable growth, and self-sufficient economy.

Agriculture is a basic part of Thailand's BCG model, especially for the bioeconomy. The Organization for Economic Cooperation and Development (OECD) defines bioeconomy as "economic activities related to the invention, development, production and use of biological products and processes." Modern biotechnology will be used to increase agricultural and industrial productivity while reducing the negative impact on public health. Thailand plans to achieve this goal by supporting innovative agricultural products and ways to increase productivity.

**2.1.2 Thailand BCG Command-and-control (CAC) Environmental Regulation Tool Concept and Classification**

The so-called command-and-control regulatory tool means that the government determines the goals and standards of environmental regulation through legislation or formulates administrative rules and regulations, and requires enterprises to comply with it in the form of administrative orders, and punishes companies that violate the corresponding goals. The means of regulation tools usually include technical standards, performance standards, etc. (Blackman et.al. 2018)

**2.2 Related Theoretical Research**

**2.2.1 Theoretical Research on Environmental Regulation**

From the 1930s to the 1960s, eight pollution incidents occurred in Belgium, the United States, the United Kingdom, Japan and other countries, causing tens of thousands of people to suffer or even die due to environmental problems. History is known as "Eight Major Pollution Incidents". This has aroused the concern of developed countries on environmental pollution, and also marked the development of the global environmental protection cause. As one of the world's new industrial countries and one of the world's emerging market economies, Thailand's 12th National Economic and Social Development Plan (2017-2021) shows that in recent years, with the rapid progress of Thai society and the vigorous economic development, Its natural resources are decreasing and the ecological environment is degrading (Office of the National Economic and Social Development Board, 2018).

The rapid urbanization of the population has caused the urbanization of the land, resulting in the continuous expansion of the city scale, especially in the megacities, such as the Bangkok area, a series of ecological problems such as the reduction of green areas, high urban surface temperature, air pollution, and water pollution are particularly prominent. (Arifwidodo and Tanaka 2015); Thailand's forest cover has been severely reduced due to the

destruction of forests by people felling trees for cultivation and taking public land for their own use.

In the Sueb Nakhasathien Foundation report, in the early 1860s, 53% of Thailand's land was covered by forest, but by 2015, the forest cover had been reduced to 31.6% (Entwisle, et al. 2008); With the increase of its industries, the air quality is also declining and the pollution is becoming more and more serious, especially in the Bangkok area, where there are a large number of cars and factories, and the exhaust gas they emit causes serious pollution to the atmosphere, and the air quality is poor (Ruchirawat, et al., 2007), according to the World Bank. It is estimated that the number of deaths due to air pollution in Thailand has increased from 31,000 in 1990 to around 49,000 in 2013 (World Bank Institute for Health Metrics and Evaluation, 2016). In the 1970s, command-and-control environmental regulation was an environmental regulation policy mainly used by governments in various countries. It aimed to protect the environment, and issued various laws and regulations to order and control corporate behavior to achieve the purpose of protecting the environment.

In the 1980s, Coase's property rights theory was gradually applied to the field of environmental regulation, and it was found that in addition to mandatory traditional environmental regulation, some non-command and control methods can also provide beneficial help to environmental protection, such as the US priority energy plan. Economic measures such as subsidies and taxes can also achieve the purpose of protecting the environment. In addition, the implementation of command-and-control environmental regulations leads to higher costs and lower returns in the process of business operations, resulting in huge operating pressures for business operations, thus the concept of environmental regulation is expanded to market-incentivized environmental regulation. Since October 2020, with the establishment of two relevant BCG committees, the promotion of the BCG model at the policy level in Thailand has been underway.

This means that Thailand's environmental regulation policies begin to emphasize the initiative and leading role of enterprises and industries, and advocate enterprises to voluntarily participate in the implementation of environmental protection, including the promotion of ISO14000, cleaner production and whole-process control, marking Thailand's voluntary environmental protection. The rapid development of regulatory policy.

**2.2.2 Theoretical Research on Enterprise Competitive Advantage**

In the 1980s, Porter put forward the concept of corporate competitive strategy, which quickly occupied the central position in the field of strategic management (Porter, 1980, 1995). The concept of corporate competitive strategy is based on the perspective of industrial structure. Competitive advantages of enterprises can be obtained, including low-cost competitive advantages, differentiated competitive advantages and key concentration advantages, so that enterprises can gain competitiveness in the development of the industry.

This theory emphasizes the choice of the industry and the competitiveness within the industry. In the 1990s, put forward a concrete strategic cost management model based on Porter's research, which provided a strategic perspective for enterprise cost management. Among the many studies involving enterprise competitive advantage, Fabriaio Noboa made a systematic discussion on the concept of enterprise competitive advantage. Enterprise competitive strategy is mainly defined from the perspective of performance. and differentiated strategic approach to achieve outstanding corporate performance capabilities in the same industry, thereby creating more value for relevant stakeholders.

The competitive advantage of an enterprise is the market performance that an enterprise uses its own resource characteristics and internal and external resources to obtain higher than the industry average profit level and strategic performance in the market competition. Among them, low-cost competitive advantage refers to taking a series of measures to reduce costs based on a certain production scale, taking a leading position in the industry, reducing production costs on the basis of experience, and minimizing R&D expenses, sales expenses, management expenses, etc. Differentiated competitive advantage strives to provide products or services that are significantly differentiated from competitors in the same industry.

**2.2.3 Theoretical Research on Enterprise Performance**

In the 1990s, Vittorio Chiesa first proposed the concept of corporate performance. Enterprise performance refers to the operating performance created by the enterprise and the performance created by the manager within a certain period of operation, emphasizing the results of the operation of the enterprise.

The industrial economic benefit evaluation system announced by the National Bureau of Statistics, the State Planning Commission and the State Economic and Trade Commission includes total asset contribution rate, capital preservation and appreciation rate, asset-liability rate, current asset turnover rate, cost profit rate, labor productivity of all employees and product sales. rate and other seven indicators.

**2.3 The Impact of Environmental Regulation on Corporate Performance**

In order to achieve the SDGs, the government has recognized that improving energy efficiency is a crucial step and has taken a series of measures to effectively encourage these measures (Zhao, et al., 2015; Dong, et al., 2015; Wang, et al., 2013). Environmental regulation increases the investment in environmental protection of enterprises, encourages enterprises to innovate production technology and produce environmentally friendly products, which will inevitably have a certain impact on the competitive advantage of enterprises. So far, the research on the relationship between environmental regulation and enterprise performance is mainly based on three hypotheses, namely "traditional hypothesis", "Porter hypothesis" and "uncertain hypothesis".

**2.3.1 Research on traditional hypothesis**

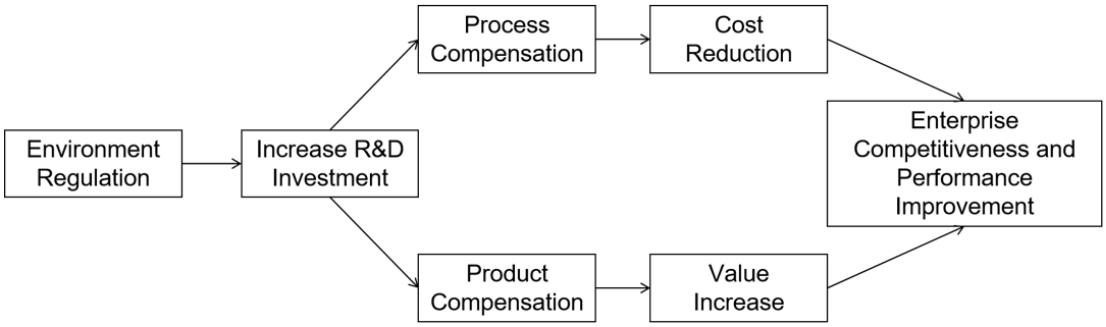
The "traditional hypothesis" holds that there is a mutually inhibiting relationship between environmental regulation and corporate performance. This conclusion is mainly derived from economic theory. Social benefits and private costs are always trade-offs, and one side pursues the improvement of environmental performance. , the other side tries to suppress the negative effects of this regulation. Representatives include Bradford and Simpson, who analyzed the relationship between environmental regulation and enterprise competitiveness from a static perspective, and believed that the implementation of environmental regulation made managers shift their focus and funds originally used to environmental management (Nakao, et al., 2007), It will not only increase the extra cost, but also reduce the income of the enterprise (Milliman , et al., 1989; Palmer, et al., 1995).

**2.3.2 Research on Porter's Hypothesis**

The "Porter Hypothesis" refers to the view that environmental regulation and firm performance support. This view is drawn from the perspective of management. It is believed that environmental regulation and corporate competitiveness will eventually achieve harmonious development, which seems to provide a "win-win" path for economic development and environmental efficiency. Representatives include Linde and Porter. They analyzed the relationship between environmental regulation and enterprise performance from a dynamic perspective, and believed that strict environmental regulation would force enterprises to innovate production technologies, especially regulatory tools based on market regulation, such as taxation or emission permit trading, through the optimization of enterprise resource allocation, Improve the production efficiency of enterprises, thereby making up or even exceeding the cost of implementing environmental governance (Wang Liping and Song Jiaojiao 2011; López-Gamero et al., 2010).

Porter and Linde (1995) believe that enterprises can benefit from environmental regulation, by stimulating enterprises to innovate technology, reduce production costs, increase enterprise competitiveness, and achieve optimal benefits (Frondel et al., 2007, therefore, environmental Regulation ultimately has a positive effect on competitiveness.

The working mechanism of the Porter hypothesis is shown in Picture 1. In addition, Potter also pointed out that in the environment of stricter environmental regulation, the competitiveness of enterprises will increase, because innovation consciousness will promote enterprises to develop new and differentiated environmental technologies. When other enterprises are also subject to corresponding environmental regulations, the competition of this enterprise will the advantage will be significantly enhanced. As Picture 1

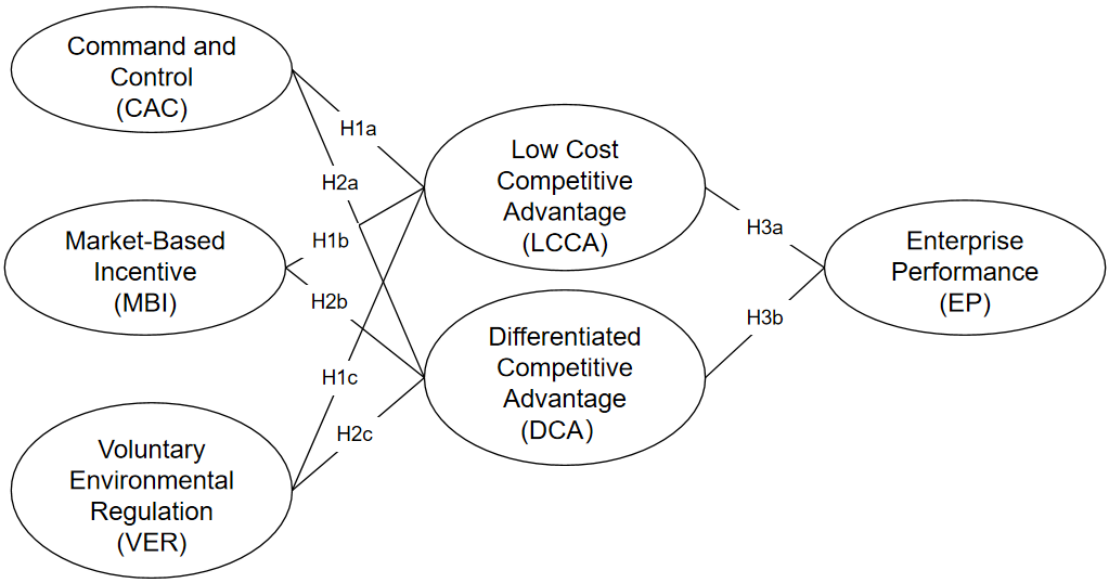



**Picture 1**: Schematic diagram of Porter's hypothesis

In the process of gradually deepening the research on related issues at home and abroad, it is found that the scope of empirical research on environmental regulation is relatively wide. Some literatures have made systematic research and analysis on the impact of environmental regulation forms on enterprise performance, especially the difference in the response of the same enterprise to different environmental regulation means, and these two factors are difficult to define. There is no clear conclusion on the impact.

Due to the late start of research on the impact of environmental regulation in Thailand, and the lack of data on compliance costs and pollution control costs in various industries, there are few empirical studies on the impact of environmental regulation on corporate performance, and most of them only stay in correlation analysis and The work at the statistical level is limited by the scope of investigation of heavily polluting enterprises and other reasons, and cannot provide a good explanation for the research results of the transmission mechanism of environmental regulation and enterprise performance.

On the basis of previous research, this paper combines environmental regulation with corporate performance and corporate competition strategy. It not only pays attention to the environmental effects of environmental regulation and corporate competition strategy, but also pays attention to the improvement of corporate performance, and builds a coordinated development mechanism for environmental protection and corporate performance. , combined with the reality of BCG model enterprises in Thailand, using structural equation model to explore the impact of environmental regulation on the competitiveness of enterprises, and subdivided and classified environmental regulation according to regulatory tools to verify Porter's hypothesis and try to find the optimal way to implement environmental regulation , in order to provide theoretical and practical basis for the "win-win" situation of environmental performance and enterprise performance, and realize the endogenous demand for sustainable development of society, economy and environment. Through literature research, this paper determines the research framework, as shown in Picture 2




**Picture 2**: Concept Framework of Research

## 3. Research Methodology

This research, the analytical tools were used to conclusions from the business performance from the study of independent variables and latent variables Based on integrated analytic tools, including statistics for SPSS, AMOSE and SEM, Mplus, EQS and Lisrel.

The questionnaire design refers to relevant research results at home and abroad, and conducts in-depth interviews with some enterprises, and selects the obvious variables according to the research purpose. According to the relevant research results at home and abroad and the theoretical framework of this paper, a total of six variables in the questionnaire are selected. Differentiated competitive advantage and business performance. The respondents to this questionnaire are from companies in industries related to the BCG model in Thailand. Most of the respondents have the status of middle and senior managers, who can participate in corporate strategic development decisions and fully and accurately grasp the market orientation and corporate strategic behavior. This questionnaire mainly consists of two parts. The first part of the questionnaire is about the basic information of the respondents, mainly including the years of establishment, industry type, ownership type and enterprise scale.

The industries of the companies participating in the survey cover the four types of industries indicated in the BCG economic model announced in Thailand in 2020, including industries such as Food and Agriculture, Medical and Wellness, Energy Material and Biochemical, Tourism and Creative Economy. The second part of the questionnaire is to investigate the observed variables of environmental regulation, corporate competitive advantage and the refinement factors of corporate performance, including command-and-control environmental regulation, market-incentivized environmental regulation, voluntary environmental regulation, and low-cost competitive advantage. , differentiated competitive advantage and measurement of six latent variables of firm performance.

All the items in this part are measured using the Richter seven-point scoring standard, and the respondents rate each item, 1-7 represent the degree from strongly disagree to strongly agree, that is, "1" represents "Strongly disagree", "2" for "less agree", "3" for "disagree", "4" for "not sure", "5" for "agree", "6" for "somewhat agree" , "7" stands for "strongly agree", and the final result will be used as the basis for statistical data.

The sample of the research object in this paper is selected from BCG related companies in Thailand. According to statistics, there are 208,788 companies in Thailand, including 7,639 BCG-related companies (Thailand Business Database https://tha.bizdirlib.com/). The specific number and proportion of companies in various industries. This paper conducts sampling according to the acceptable error rate of Taro Yamane (Taro Yamane, 1973), and finally distributes 400 questionnaires (https://greedisgoods.com/taro-yamane/). The questionnaires are distributed according to the proportion of different industries in BCG-related enterprises, and cover enterprises with different years of establishment, different ownership forms and different scales, and the samples are well representative. The questionnaire data has been tested for validity and reliability, and it also has good reliability and validity. In view of the fact that the questionnaire involves some more professional issues in the operation and management of enterprises, this questionnaire is required to be filled out by the middle-level and above management personnel of the surveyed enterprises.

## 4. Results

The statistical analysis of the industry characteristics of the survey samples in this study is shown in Table 1

**Table 1** Analysis of sample industry characteristics (n=322)

| | Statistics | Number of Samples | Percentage |
|---|---|---|---|
| Industry | Food and Agriculture | 194 | 60.25% |
| | Medical and Wellness | 54 | 16.77% |
| | Energy Material and Biochemica | 48 | 14.91% |
| | Tourism and Creative Economy | 22 | 6.83% |
| | Other | 4 | 1.24% |
| | **Total** | 322 | 100.00% |

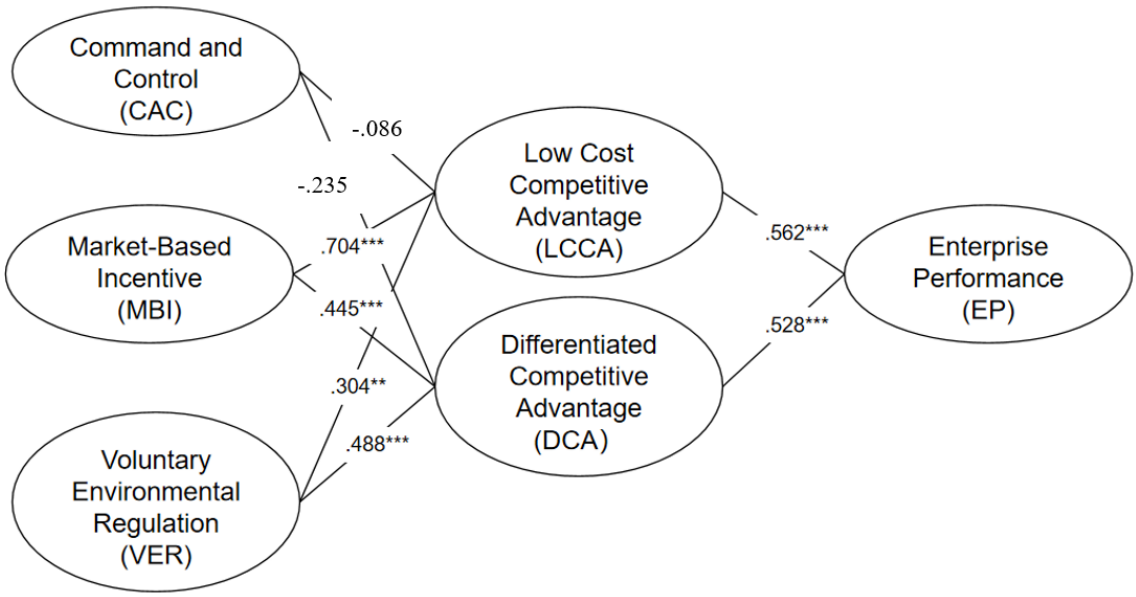
Among the 322 surveyed samples, 86 companies in Food and Agriculture, accounting for 26.71% of the total number of valid samples; 79 companies in Medical and Wellness, accounting for 24.53% of the total number of valid samples; 66 companies in Energy Material and Biochemical, accounting for 20.50% of the total number of valid samples; 87 companies in Tourism and Creative Economy, accounting for 27.02% of the total number of valid samples; 4 companies in Other, accounting for 1.24% of the total number of valid samples.

**Table 2** Path coefficients and statistical tests among the variables of the model

| Assumption | Path | Std. | S.E. | t-value | P | Test Result |
|---|---|---|---|---|---|---|
| H1a | Low Cost Competitive Advantage, LCCA ⟵ Command and Control, CAC | -.086 | .134 | -.641 | .521 | Not Support |
| H1b | Low Cost Competitive Advantage, LCCA ⟵ Market-Based Incentive, MBI | .704 | .143 | 4.906 | *** | Support |
| H1c | Low Cost Competitive Advantage, LCCA ⟵ Voluntary Environmental Regulation, VER | .304 | .106 | 2.87 | ** (.004) | Support |
| H2a | Differentiated Competitive Advantage, DCA ⟵ Command and Control, CAC | -.235 | .144 | -1.637 | .102 | Not Support |
| H2b | Differentiated Competitive Advantage, DCA ⟵ Market-Based Incentive, MBI | .445 | .134 | 3.328 | *** | Support |
| H2c | Differentiated Competitive Advantage, DCA ⟵ Voluntary Environmental Regulation, VER | .488 | .124 | 3.944 | *** | Support |
| H3a | Enterprise Performance, EP ⟵ Low Cost Competitive Advantage, LCCA | .562 | .114 | 4.932 | *** | Support |
| H3b | Enterprise Performance, EP ⟵ Differentiated Competitive Advantage, DCA | .528 | .123 | 4.291 | *** | Support |

Note: *** for P < 0.001, ** for P < 0.01

The research results are shown in Table 4.17 and Figure 4.1. The critical ratios (t-values) of "low-cost competitive advantage ⟵ command-control environmental regulation" and "differentiated competitive advantage ⟵ command-controlled environmental regulation" are less than 1.96, with a significant (P) is greater than 0.05, that is, command-and-control environmental regulation does not have a positive impact on low-cost competitive advantage and differentiated competitive advantage. Therefore, the assumptions H1a, H2a do not hold. Except for the above two paths, the critical ratio (t-value) of other paths is greater than 1.96, and the significance (P) is less than 0.05. This indicates that the influence relationship between other paths exists and is significant.




**Picture 3**: Model path coefficient estimation results

## 5. Discussion and Suggestions

### 5.1 Discussion

(1) The command-and-control environmental regulation has no positive effect on the low-cost competitive advantage of enterprises (López-Gamero et al., 2010), and the path coefficient is -0.086 (P=0.521), which indicates that the command-and-control environmental regulation has no positive effect on the low-cost competitive advantage of enterprises. to influence the relationship, so hypothesis H1a does not hold.

The reason for this result may be that most enterprises only passively accept and comply with the command-and-control environmental regulations, which inevitably increases the operating pressure of enterprises in the short term and increases the production costs of enterprises. The positive effect of "compensation" lags behind the negative effect of "following costs" (Zhang Cheng, et al., 2011); on the other hand, most of the heavily polluting enterprises surveyed are traditional resource-intensive enterprises, which generally have strong dependence on resources and core Problems such as the inherent lack of competitive advantage, weak strategic flexibility, inability to adjust internal operations in a timely manner, and it is difficult to generate corporate competitive advantages.

However, market-incentivized environmental regulation and voluntary environmental regulation have a significant positive impact on the low-cost competitive advantage of enterprises. Enterprises can obtain low-cost competitive advantages through the production of environmentally friendly products, innovative production technologies and equipment, expand customer groups, and enable enterprises to occupy a favorable position in the industry. Therefore, it is assumed that both H1b and H1c are established. The conclusion of

this study confirms the research of Ma Shiguo (2008) and Feng Yunke (2012), that is, under the same emission reduction standard, command-and-control environmental regulation costs more than market-incentive environmental regulation, because the latter mainly It takes advantage of the differences in the ability of enterprises to reduce pollution (Feng Yunke, 2012; Ma Shiguo, 2008).

(2) The command-and-control environmental regulation does not have a positive impact on the differentiated competitive advantage of enterprises, and the path coefficient is -0.235 (P=0.102), which indicates that the command-and-control environmental regulation has a poor incentive effect on technological progress, and does not It will prompt the enterprise to formulate a differentiation strategy (López-Gamero, et al., 2010), and there is no definite effect on the enterprise's differentiated competitive advantage, so the hypothesis H2a does not hold.

The reason is that although the command-and-control environmental regulation has a significant effect on improving the environment, the excessively high regulation cost means that companies will compulsorily use the funds originally used for other plans for the government-designated environmental protection technologies and emissions for pollution control and emission reduction. The terminal treatment technology of waste has caused homogeneous competition among enterprises.

The market-incentivized environmental regulation and voluntary environmental regulation both have a significant positive impact on the differentiated competitive advantage of enterprises, and the degree of influence is equal. The path coefficients are 0.445*** and 0.488*** respectively, indicating that the market incentive and Under voluntary environmental regulation, enterprises improve customer satisfaction and loyalty through environmental governance and innovation, and enhance corporate brand image and reputation (López-Gamero, et al., 2010). Therefore, it is assumed that both H2b and H2c are established.

(3) Both the low-cost competitive advantage and the differentiated competitive advantage of the enterprise have a significant positive impact on the performance of the enterprise, and the effect relationship is similar, and the path coefficients are 0.562*** and 0.528*** respectively, indicating that the low-cost competitive advantage of the enterprise Differentiated competitive advantages can effectively improve corporate performance. Therefore, it is assumed that both H3a and H3b hold. It can be seen from the above analysis conclusions that the eight null hypotheses of this study, except that H1a and H1b do not hold, are all supported.

The challenging strategy focus sustainability to make differentiated competitive advantage value through big business more high benefit specially concern environment and Policy Development to drive more, add more high performance of BCG model apply by Thailand Government and business policy as same direction in order to optimize the BCG

environment in Thailand to sustainability. Regulatory policies and enterprises' implementation of competitive strategies to obtain financial performance and provide optimizing Thailand's BCG environmental regulation policy develop and extending the Thai BCG model to more countries.

**5.2 Policy's Suggestions**

(1) Incentive regulatory policy orientation is the premise to enhance the competitiveness of enterprises.

According to the empirical results of this paper, it is suggested that the standard and intensity of market-incentive environmental regulation should be appropriately improved, and voluntary environmental regulation should be promoted more. Only the environmental regulation that is compatible with incentives and constraints can effectively achieve the coordination of environmental performance goals and corporate performance. From the perspective of market incentive-based environmental regulation, driven by corporate performance, enterprises will be more proactive in transforming and upgrading technologies and product production processes such as pollution control and emission reduction, so as to achieve a "win-win" situation in improving environmental protection and economic benefits. Purpose: From the perspective of voluntary environmental regulation, in order to maintain the enterprise and improve the social image of the enterprise, the enterprise no longer passively accepts environmental protection laws and regulations, but becomes an advocate of environmentalism, willing to take the social responsibility of environmental protection, and the enterprise actively abides by it. Voluntary environmental regulation. Therefore, appropriately increasing the intensity of market incentive-based environmental regulation and voluntary environmental regulation can increase the incentive for technological innovation of enterprises, and on the premise of ensuring the efficient functioning of environmental regulation, it can exceed the negative impact of environmental regulation on corporate performance and achieve a win-win situation. situation. However, the intensity of environmental regulation cannot be increased blindly and infinitely. Under the pressure threshold that the enterprise can bear, and according to the actual situation of the industry, it is necessary to select regulatory policy tools to stimulate technological innovation.

(2) Develop a long-term strategy to advance the construction of the BCG economic model

Thailand's construction of the BCG economic model is destined to be a long-term project, and a long-term strategy must be established based on reality. The first is to combine Thailand's 4.0 goals, formulate a timetable and road map for the construction of the BCG economic model, with a five-year development stage, clarify the main goals and key tasks of each stage, and make progress for a long time, and no matter which political party Ruling must continue. The second is to support GC Petrochemical co., Siam Cement Group (SCG),

Toyota and Dow Thailand company and other companies to carry out the pilot project of BCG economic model construction; at the same time, combined with the "Eastern Economic Corridor" plan (EEC plan) and other major national strategies to promote regional The BCG economic model construction pilot project has realized the "point to surface" promotion of the BCG economic model construction pilot. The third is to establish and improve the BCG economic indicator system and regular evaluation mechanism, and evaluate while constructing during the implementation process to steadily advance in the correct direction.

(3) Establish a multi-channel and normalized publicity and education system to guide the whole society to practice the concept of BCG economic model

The establishment of the concept of environmental priority and the popularization of environmental education are the prerequisites and guarantees for public participation in environmental protection. It is suggested that the cultivation of "BCG culture" should be an important task in the construction of BCG economic model. The first is to actively promote normalized environmental protection education, incorporate environmental protection courses into the teaching plans of primary and secondary schools, and strive to improve citizens' environmental quality and sense of environmental responsibility. The second is to actively use media platforms, environmental education bases, etc. to vigorously publicize the concept, work measures and progress of the BCG economic model to the society, and enhance the public's awareness of the BCG economic model. The third is to support social welfare organizations to carry out related activities and gather social forces to participate in the construction of the BCG economic model. The fourth is to actively carry out the creation of "BCG City Cells" such as conservation-oriented institutions, green families, green schools, green communities, green travel, green shopping malls, and green buildings, establish a BCG demonstration model, and guide the whole society to practice the BCG concept.

### 5.3 Suggestion for the future research

According to the above shortcomings, this paper still has room for improvement in the following aspects:

1）Increase the sample size of the study. This study was limited by many objective factors in the research process, resulting in only 322 valid sample data in the end. In future research, the collection of sample data can be increased to reduce the negative impact on research results caused by problems such as sample size.

2）Expand the scope of investigation. The subjects of this survey are mainly for food and agriculture, medical and health, energy, materials and biochemistry, tourism and creative economy and other industries related to the BCG model in Thailand recommended by experts in some areas of Thailand. Therefore, the survey results are limited by regions and industries. In future research, the scope of the research area and industry can be expanded to improve the representativeness and general applicability of the sample.

3) Enrich the research content. It can increase the research on the mechanism of market structure, governance structure and other factors in the impact of environmental regulation on enterprise performance. Due to constraints such as time and sample size, there is no research and consideration of factors such as industry category, enterprise scale, social awareness of environmental protection, market structure in which the enterprise is located, and governance structure. In the future research, we should not only consider the key factors within the enterprise, but also expand the research scope and improve the index system.

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