

論文 / 著書情報  
Article / Book Information

題目(和文)	効率性における石油・ガスサプライチェーン・マネジメントの評価と地域格差 - データ包絡分析法の応用
Title(English)	Assessment of Oil and Gas Supply Chain Management and Regional Differences in Efficiency: Application of Data Envelopment Analysis
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Category(English)	Doctoral Thesis
種別(和文)	論文要旨
Type(English)	Summary

(博士課程)  
Doctoral Program

## 論文要旨

THESIS SUMMARY

系・コース Department of, Graduate major in	Innovation Science	系 コース	申請学位 (専攻分野) Academic Degree Requested	博士 Doctor of	( Management of Technology)
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要旨 (英文 800 語程度)

Thesis Summary (approx.800 English Words)

This thesis title is "Assessment of Oil and Gas Supply Chain Management and Regional Differences in Efficiency: Application of Data Envelopment Analysis." The thesis compromise 7 chapters.

Chapter 1 (Introduction) presents an overview of a global trend of the Oil and Gas (O&G) industry, which is the core of the research, are global energy issues that are argued by the United Nations Sustainable Development Goals (SDGs). The introduction explains the significance and importance of research in the O&G industry based on the discussion. Further, the O&G industry structure regarding its supply chain is explained. The O&G supply chain consists of the upstream segment that develops and produces, the midstream segment that transports, and the downstream segment that carries out refining and sales. Analysis from the viewpoint of chain and regional disparities clarified that it is linked to the proposal of efficiency improvement measures.

Chapter 2, "Literature Review," discusses three scopes of previous research related to the O&G industry, including research on supply chains, research on environmental issues, and data envelopment analysis (DEA). The three categories analyze the efficiency, and a comprehensive survey is conducted. Furthermore, after showing that many kinds of research have been done in each group, there is a research gap of every scope; in particular, there is research dealing with environmental problems. However, the efficiency analysis of O&G companies that introduced the concept of disposability in production economics is very few. Further, a few previous studies have taken a holistic view of the O&G supply chain from the exploration field to the distribution center. Therefore, this research is conducted to fill the gap in previous researches regarding these issues. Then this research in this research field arguing that it will lead to its own contribution.

Chapter 3 "O&G Supply Chain Characteristics and Industry Issues" the functions and features of the business related to the upstream, midstream, and downstream sectors of the O&G industry described in Chapter 1 are described in more detail concerning the region. It also outlines the business contents of major operators included in the data used in the empirical analysis for each supply chain segment and describes the challenges and changes in the business environment surrounding the O&G industry and technical and management issues.

Chapter 4, "Data Envelopment Analysis," discusses the history of development and the basic concept of the analysis method DEA used in the two main empirical chapters (5&6) of the thesis. DEA is an analytical method that derives the relative efficiency of decision-making entities consisting of multiple inputs and outputs from a mathematical model based on linear programming. DEA is widely used in

operations research and management science research. The characteristics of the basic Radial mode and the Additive model, which is closely related to the DEA Environmental Assessment models used in Chapter 5 of this paper, are explained.

Chapter 5, "Vertical Structure and Efficiency Assessment of the US Oil and Gas Companies," covers 34 major O&G companies in the United States from 2011 to 2015. The panel data set is classified into two groups (integrated and independent) according to the presence of upstream and downstream supply chains. The DEA Environmental Assessment is applied to perform comprehensive efficiency analysis, including environmental factors. As a result, it was clarified that the vertically integrated enterprises with a supply chain are relatively efficient. The effects of differences in the technology used and environmental regulations are described. In particular, regarding the impact of regulations on efficiency, this chapter also investigates what kind of environmental regulations have been introduced in countries and states and discussing the impact on efficiency.

Chapter 6, "Assessment of Oil Refinery Performance: Application of Data Envelopment Analysis-Discriminant Analysis," focuses on the downstream sector of O&G industry. Whether there is a regional difference in the efficiency of O&G companies, its extent, and the reason for this, the technical aspects and the differences between regulatory and environmental policies are discussed. It is divided into four regions: the United States/Canada, Europe, the Middle East/Africa, and Asia/Pacific. This chapter describes the analysis method using DEA-Discriminant Analysis in combination with DEA and the analysis results. As a result of the analysis, companies located in the United States and Canada are relatively more efficient than those in the three regions. Further, based upon analysis results, desirable measures for businesses in each region to improve efficiency are discussed.

Chapter 7 "General Discussion and Conclusion" the results obtained from the empirical analyzes in Chapters 5 and 6 are organized by comparing them with the analysis hypothesis. The results of the analysis unique to this study are presented. It describes the importance of vertically integrated supply chains on the efficiency of O&G companies and the impact of regional regulations and technology differences. Finally, future work relates to this research, and the limitations of the empirical studies are also discussed.

(797 words)

備考：論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 1 部提出してください。  
Note : Thesis Summary should be submitted in either a copy of 2000 Japanese Characters and 300 Words (English) or 1 copy of 800 Words (English).

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