



저작자표시 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.
- 이차적 저작물을 작성할 수 있습니다.
- 이 저작물을 영리 목적으로 이용할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#) 

**A Study on the Effects of Triple Bottom Line Factors on
Cruise Ports' Performance: Focused on Major Korean Cruise
Ports**



By

Hyo Kyung Kang

Graduated School of Korea Maritime and Ocean University

Department of KMI-Copperative Program

Approval Page

This thesis, which is an original work undertaken by Hyo Kyung Kang in partial fulfillment of the requirements for the degree of Master of Business Administration, is in accordance with the regulations governing the preparation and presentation of the thesis at the Graduate School in the Korea Maritime and Ocean University, Republic of Korea.

Approved by the Thesis Committee:

Prof. Dong Keun Ryou

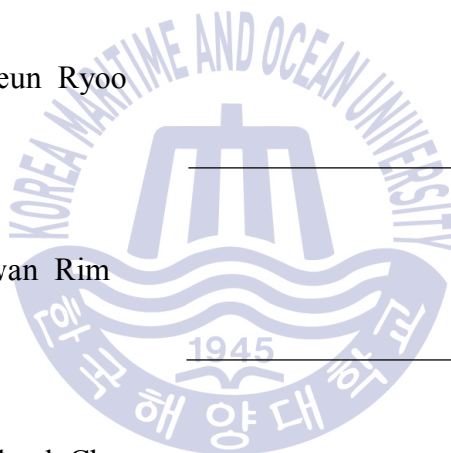
Chairman

Prof. Jong Kwan Rim

Member

Prof. Seong-Cheol Cho

Member



Department of KMI-KMOU Cooperative Program

Graduate School of Korea Maritime and Ocean University

February 2018

Table of Contents

List of Tables	iv
List of Figures	v
Abstract	vi
1. Introduction	
1.1 Background of Study	1
1.2 Research Problem	4
1.3 Purpose of the Research	4
2. General Description of Cruise Port and Research Method	
2.1 Cruise Port	5
2.1.1 Concept of Cruise	5
2.1.2 The Concept and Type of Cruise Port	6
2.1.2.1 Home Port	6
2.1.2.2 Secondary Port	8
2.1.2.3 Base Port	8
2.2 Strategic Factors for Cruise Port Competitiveness	9
2.3 Triple Bottom Line and Sustainable Management	11
2.4 Regression Analysis	14
2.4.1 Structure of Regression Analysis	14
2.4.1.1 All Possible Selection	15

2.4.1.2 Forward Selection	15
2.4.1.3 Backward Elimination	15
2.4.1.4 Stepwise Selection	16
2.4.2 Statistical Coefficient	16
2.4.2.1 Standardized Coefficient,(β)	16
2.4.2.2 Determination Coefficient	17
2.4.3 Multi-Collinearity	17
2.4.4 Determination of Significance	18

3. Research Model and Results

3.1 Research Model	19
3.2 Data	20
3.3 Analysis of Correlation	23
3.4 Analysis of Significance of TBL Models in Cruise Port's Performance by TBL Factor	25
3.4.1 Analysis of Significance of TBL Model	26
3.4.2 Analysis of Significance of the Economic Factors' Model	27
3.4.3 Analysis of Significance of the Environmental Factors' Model	28
3.4.4 Analysis of Significance of the Social Factors' Model	29
3.5 Influence of TBL Factors on the Performance of Cruise Port in Regression Analysis	30
3.5.1 TBL Factors to Number of Cruise Ships Arrivals	30
3.5.2 TBL Factors to Number of Cruise Passengers	31
3.5.3 Economic Factors of TBL	32
3.5.4 Environmental Factors of TBL	34
3.5.5 Social Factors of TBL	36
3.6 Influence of TBL Factors on Performance of Cruise Port	38
3.6.1 Influence of TBL Factors on Performance of Busan Cruise port	38
3.6.2 Influence of TBL Factors on Performance of Incheon Cruise port	39

3.6.3 Influence of TBL Factors on Performance of Jeju Cruise Port 40

4. CONCLUSION

4.1 Summary and Conclusion 41

4.2 Limitation of the Thesis 43



List of Tables

Table 1 Korean Major Cruise Terminal	3
Table 2 Factors of Home Port	7
Table 3 Triple Bottom Line Factors	21
Table 4 Descriptive Statistics of Variables	22
Table 5 The Correlation between Factors of Cruise Performance	24
Table 6 Analysis of F-test for Triple Bottom Line Model	26
Table 7 Analysis of Triple Bottom Line Model	26
Table 8 Analysis of F-test for Economic Factors' Model of TBL	27
Table 9 Analysis of Economic Factors' Model of TBL	27
Table 10 Analysis of F-test for Environmental Factors' Model of TBL	28
Table 11 Analysis of Environmental Factors' Model of TBL	28
Table 12 Analysis of F-test for Social Factors' Model of TBL	29
Table 13 Analysis of Social Factors' Model of TBL	29
Table 14 Influence of TBL Factors to Number of Cruise Ships Arrivals	30
Table 15 Influence of TBL Factors to Number of Cruise Passengers	31
Table 16 Influence of Economic Factors to Number of Cruise Ships Arrivals	32
Table 17 Influence of Economic Factors to Number of Cruise Ships Arrivals	33
Table 18 Influence of Environmental Factors to Number of Cruise Ships Arrivals	34
Table 19 Influence of Environmental Factors to Number of Cruise Passengers	35
Table 20 Influence of Social Factors to Number of Cruise Ships Arrivals	36
Table 21 Influence of Social Factors to Number of Cruise Passengers	37

List of Figures

Fig. 1 Triple Bottom Line	12
Fig. 2 The Research Model with Triple Bottom Line	19
Fig. 3 Influence of TBL Factors on the Performance of Busan Cruise Port	38
Fig. 4 Influence of TBL Factors on the Performance of Incheon Cruise Port ..	39
Fig. 5 Influence of TBL Factors on the Performance of Jeju Cruise Port	40



크루즈 항만의 성과에 대한 Triple Bottom Line 요소들의 영향력 분석 : 한국의 주요 크루즈 항만들을 대상으로

강효경

한국해양대학교 대학원, 해양정책융복합과

요약

Triple bottom Line(TBL) is a comprehensive framework to evaluate the sustainability of an organization by integrating the triple important dimensions of economic, environmental, and social factors. This study analyzes the effects of the TBL factors on the performances of cruise ports by developing a linear regression model. A set of the time-series data of 15 years for various variables on the performances of major Korean cruise ports is used for the study. All the independent variables are grouped into three to form an analyzable data set within the TBL framework, and the statistical results are analyzed to show the impacts of the TBL factors on the cruise ports' performance and sustainability. This study also suggests some policy implications important to develop major Korean cruise home ports for sustainable Korean cruise industry.

핵심어 : Triple Bottom Line, 크루즈 항만, 다중회귀분석모형

Chapter 1 Introduction

In this chapter, the background information and aims of this study will be introduced. This chapter includes three main parts. Firstly, the background of the research is described. Then, the study purposes and the thesis structure are followed.

1.1 Background of the Study

The early 1900s showed the first rapid growth of the cruise tourism industry initiated by the operation of the first cruise ship, 'Queen Mary' by the White Star Line. Since the 1980's the second boom of the world cruise tourism have been observed with the fast improvement of the living standards in the North America and Europe. Currently the cruise industry has been found the fastest growing single sector in the world tourism market, and has attracted constant attention as the most dynamic and promising industry in the 21st century. (Lee, Noh & Lee 2013)

According to the CLIA 2015 report, the cruise industry is one of the fastest growing industries in the tourism industry and has an impact on the global economy about \$1200 trillion. The demand for cruise tourism has grown an average annual rate of 7.6% over the past two decades, and the number of cruise tourists worldwide has increased from 10.1 million in 2000 to 19.2 million in 2011 and increased to 24 million in 2016. The share of Asian tourists increased by 53% in 2016 compared to 2013, and Asia is still growing in the cruise industry. As a result, the number of inbound tourists by cruise ships to Asian ports increased by more than 29% in 2017 compared to 2016. In Korea, the number of cruise tourists reached 175,000 in 2010, and is expected to reach 285,000 in 2020.

Along with these changes, many countries and local governments are actively

promoting the construction of terminals and facilities related to tourism to attract cruise ships along with the development of tourism products. In response to the expansion of the cruise market in Northeast Asia, the Korean government plans to establish and implement policies such as the development of ports that have specialized berth to cruise ships and the approval of cruise ship casinos to improve the competitiveness of the national cruise industry. The reason why government makes policy and marketing strategy for cruise tourism is that the cruise industry not only has a high economic ripple effect but also expects the industry to grow rapidly from now on.

Cruise ports are complex harbors with facilities capable of berthing cruise vessels. In order to be a successful cruise port, complicated infrastructure factors must be considered such as port facilities as well as connectivity with surrounding areas and environmental factors. For instance, the environmental factors alone could not improve performance of the cruise port. If the environment around the port become worse, the advantage of the cruise terminal will decrease. Social factors, which mainly consist of connections with the international airports, considered in this research also affect cruise liners and passengers. In short, to develop a competitive cruise port, various complex factors must be taken into account, not only in infrastructure such as port facilities but also in connecting areas potentially rich in tourism resources and environmental factors. In this regard, the total 'sustainability' from the TBL view points should be considered seriously for any reliable strategies to develop cruise ports.

Ordinary passenger terminals were usually used to serve cruise passengers until the construction of the Busan Dongsam-dong International Cruise Terminal. Since the Dongsam-dong International Cruise Terminal was so limited in service capacity that the cruise ships had to use the general cargo pier when the passenger dock was crowded or when large ships entered the port. Cruise passengers were moved to the passenger terminal via the cargo pier, causing many inconveniences.

In April 2008, the first cruise terminal in Korea was built at Dongsam-dong, Busan. Jeju operates an international ferry terminal, and Incheon operates a cruise dock at a new international passenger terminal. The table below shows current status of major cruise terminals in Korea.

Table 1 Korean Major Cruise Terminal

	Busan	Incheon	Jeju
Cruise Terminal	Yeong-do International Cruise Terminal	New International Ferry Terminal	Jeju International Ferry Terminal
Depth of water	5m-14m	5m-15m	5m-14m
Average of Cruise ships arrival for 10years (2005-2015)	69	34.5	107.1
Average of Cruise Arrivals for 10 years (2005-2015)	93,442	41,779	198,175
Facilities of Cruise Terminal	Convenience store, tourist center, Duty-free shops, Medical center, Cruise lounge and etc	Duty-free shops, Pharmacy and etc.	Duty-free shops, Cruise lounge and etc

<Data :Reconstructed based on ' An empirical study on the development direction of the cruise port infrastructure in Korea>

1.2 Research Problem

The previous section showed in brief the current status of Korean cruise port and industry. It can be seen that most of the government policies are concentrated on port development and infrastructure improvement for cruise customers' convenience. For the development of Korea's cruise industry, the Korean government has implemented policies such as expanding tax reductions for port facilities for cruise ships, reflecting the maritime laws for cruise ship operations, expediting entry and departure procedures such as boarding and immigration inspection, and approving passenger transportation business for foreign cruise companies.(Oh, 2013)

In addition, Jun ho Jang(2011) proposed the following development strategies for Korean cruise industry: the government should establish a dependable long-range plan for the development of cruise tourism industry both at central and local government levels. The long-range plan must include the expansion of dock reserved only for cruise ships, establishment of foundation for domestic cruise ship owners, introduction of simplified immigration system for cruise passengers' convenience, and attraction of international tourists.

1.3 Purpose of the Research

There have been many studies about the factors determining the performance of cruise ports. However, most of them considers economical benefits or environmental effect independently. This study includes economical, social, and environmental factors together using the TBL framework, and attempts to explain the performance of cruise ports from the total sustainability view point. The multi liner regression model is used to identify the sustainability elements that significantly influence the ports performance. It is also discussed that the study results suggest some important policy implications for the sustainable development of Korean cruise ports.

Chapter 2 General description of Cruise Port and Research Method

2.1 Cruise Port

2.1.1 Concept of Cruise

The cruise originated in the 'Kruisen', meaning that the Dutch crew crossed or traversed.(Gold, 1990) Also it means that 'traveling with a ship (Lee, 2004)' and it defines traveling from a ship for the purpose of enjoying leisure time away from daily life, not for commercial purpose. As a result, cruise tourism could be expressed as traveling with the facilities necessary for various types of accommodation, dining facilities, multi-pleasure activities, and high-quality tourism services and safety on ships operating regularly or irregularly. In other words, 'enjoying leisure time with one or more overnight trips on a ship that can accommodate more than 100 people' is called a cruise. (Lekakou et.al, 2005).

Some cruise lines operate regularly, but most of them have non-schedule. Most of the cruise ships are not regularly operated and visit the harbors of various countries irregularly. Therefore, they are characterized by the nature of shipping and tourism. These characteristics are in the sense that the passengers could experience famous ports in the major countries and famous tourist attractions in the background and connection areas. In addition to these features, the cruise ship continues its maritime transport linking major ports in various countries with looking around certain tourist attractions and staying for a certain period of time. As a result, passengers are able to experience multi-cultural tourism products such as cultural and historical sites. (Jang, Huh & Chung, 2011)

On the other hand, operating cruise ships and carrying out value added activities is called the cruise industry. The cruise industry has a positive effect on related

industries such as airline, shipping, shipbuilding, port, tourism, culture, etc. due to the increase of consumption expenditure of tourists and the development of various products such as fly & cruise which is related with airline. (Ministry of Cultural, Sports and Tourism, 2006) In addition, the cruise industry shows the economic ripple effect in various aspects. The cruise industry creates the income of the region or country, improves employment, promotes marketing activities of destination and promotes potential investment.(Vaggelas, 2011)

2.1.2 The Concept and Type of Cruise Port

According to the Port Act, ports are defined as "harbours with facilities that allow people to get in and out of the ship and load or unload cargo on board." Kim(2009) stated that the port is a relay point for maritime and land transportation, and that sufficient depth of water and wide berthing facilities are necessary for the maritime transport vessel to berth securely. Also, it should be equipped with cargo handling equipment, warehouses, cargo facilities and land transportation, customs and quarantine facilities and indirect facilities necessary for entering and leaving ports.' Cruise ports should be located close to the famous cruise area or route so that whether the port is included in the current or future cruise itinerary is an important criterion for attracting cruise liners. Cruise ports are classified into three types according to their operational characteristics: home port, secondary port, and base port.

2.1.2.1 Home(Mother) Port

The home port is departure of the cruise ship and the basic facility is more important than the function for sightseeing as compared with other kind of cruise ports. In addition, it should be well connected with other means of transportation as well as the loading and unloading facilities and baggage loading facilities for

passengers.

In recent years, as cruise ships become bigger, the ships are required to be able to handle many passengers and baggage, because it takes a lot of time for passengers to board, drop, and process baggage.

The cruise market conditions proposed in the Choi & Kim(2016)'s study are as follows.

The factors, that are required in the cruise port, are facilities for handling mass passengers, boarding and submerging infrastructure of passengers, and convenience of departure and entry of passengers. On the other hands, the external factors of the port include that the closeness of the passenger market, the market size of the city nearby the cruise port, the accessibility with the international airport, and the tourist attractions of the cruise port. Therefore, there should be a facility for rapid and efficient boarding and disembarkation of passengers within the port, and an international airport is required nearby the port and the port and airport should be geographically adjacent. In addition, the connection with the city behind cruise port, and the attractions, where passengers can enjoy convenient and pleasant sightseeing, were also important.

Table2 Factors of Home Port

Internal factors of the port	Mass passenger handling capacity, passenger boarding and docking infrastructure, convenience of entry and exit of passengers
External factors of the port	Distance to market, port related market size, international airport accessibility, tourism attractiveness of the region, connectivity of airport

2.1.2.2 Secondary Port

The secondary port is located on the all cruise schedule. The port provides cruise ships with fresh water, bunker, food and other goods for continuous voyage, and provides passengers with sightseeing.

Secondary ports should be well equipped with port services that can provide the services required by cruise ships. Ports should be freely accessible for customs, immigration and quarantine services.

In addition, the ports must have interesting attractions or unique culture in a historically important area and have a good climate in order to induce passengers to drop off at the secondary ports. Most importantly, the cruise line is not long anchored at the ports, so that the transportation should be well developed between the port and the tourist sites or city and should be located close to the location.

2.1.2.3 Base Port

The base port is a mixed type of home port and secondary port, and it serves as a home port of the cruise ship and also provides services that secondary port did to the cruise ships that are on schedule. The base port is not much larger than the home port, and provides better convenience than the secondary port.

In order to become a base port, it is necessary to have convenience to find accommodations to passengers and crews and locates nearby the airport for passengers boarding and departing on cruise lines. Lastly, connection with public transportation and the airport close to base port is necessary.

2.2 Strategic factors for Cruise Port Competitiveness

The factors, that liners choose the port of call, are very diverse and complex. Research on charm as a cruise port has been carried out variously, and port facilities, service level, geographical location and cost factors are generally considered as the main factors. Lee(2002) describes the factors that cruise terminals or ports should have such as convenience facilities, parking facilities, private berths, port facilities including refueling facilities, loading facilities, passenger boarding and landing facilities, connection between the port and related city, and tourism infrastructure in the related region which could be tourism resources and shopping center. Lee also suggested the direction of cruise port development by presenting detailed factors for each factor.

Lee, Lee, Noh(2013) selected Busan, Incheon, Jeju and Yeosu ports, which are likely to develop as international cruise ports. Based on these harbors, they compared the results of the analysis of the existing port conditions and cruise port success factors with the port-specific plans presented in the Third National Port Basic Plan (2011-2020). The crucial factor for success of cruise port was selected as the most important item of connection between the port of destination and traffic.

In order to be selected as a cruise port, the environment is most important. It is also found that each environment related to the visitor should have an organic cooperation system. Through such a mutual cooperation system, it is suggested that the improvement of traffic environment, the provision of a berthing facility for cruising, and the provision of incentive for cruise ship owners through law and manufacturing facilities could provide a competitiveness as a home port.(Yang et al., 2015)

Ha and Lee(2002) suggested surrounding tourism resources and the accessibility to airport from the port as the factors of suitable harbor or international terminals

for the cruise. Also they empathized the non-port factors for cruise terminal, such as the involved ground transportation, parking space, shopping centers, and the easy accessibility to the airport.

Choe and Kim(2016) analyzed the internal environmental factor and the external environmental factor of port as important factors in the cruise port of Asia. As a result, the ability to handle mass passengers was the most important factor for environmental factors inside the port, and the next most important factor was dock infrastructures and passengers' exit and entry convenience. On the other hand, the external factors such as the proximity of the passenger market, the size of the city's market closed to the cruise port, the accessibility of the international airport, and the attractiveness of the local tourism were all equally important. Lee and Lee(2016) insisted that port and immigration infrastructures should be maintained constantly in order to improve the competitiveness of Busan port. At the same time, it should be focused and improved on marketing activities and sightseeing in port cities. In addition, the tourist facilities of Busan Port were low in importance, but they were needed fields. Welcoming events in ports could be helpful in enhancing image and satisfaction, but they had little influence.

Naci Polat(2008) assessed the development direction in the rapidly growing cruise sector and presented the sustainable development direction of the cruise tourism industry in Turkey in terms of environment, technology, economy, socio - cultural aspect. In the future, various environmental regulation policies and laws will be enacted in the cruise industry. Also, it was argued that technology development will lead to a lot of environment friendly ships. The author said that the convenience from the development of the technology would give benefit to the cruise liners but not to the sailors and port of call. Lekakou, Pallis, Vaggelas(2009) suggested the issue of home port selection by the cruise industry. From this study, they figured out the most important influencing factors of home port which were the availability of an international airport near the cruise port, the provision of a

safe and secure environment for the passengers, and issues relating with political factors and the legislative framework such as cabotage policy.

A study suggested that for sustainable cruise tourism, cruise tourism should maximize local profits while at the same time reducing negative impacts, which will protect the natural environment of cruise ports around the world. To do this, the impacts on the economic, social and environmental aspects should be considered. In the environmental aspect, it affected the environment directly or indirectly by the foreign tourists as well as the ship. On the social side, local small- and medium-sized tourism companies have difficulty in competing because they could not accommodate large-scale tourists. In economic terms, they argued that there may be more opportunity costs than benefits to the local economy.(Lee et al., 2013)

Bayasit, Sune and Kirval(2015) looked at crucial factors in determining the cruise port in the Mediterranean region. Factors, considered important in the survey, were selected. As a result, the most important factors were cost of port service and the port services to ships. Infrastructure of port and intermodal transport are considered to be important.

2.3 Triple Bottom Line and Sustainable Management

Sustainability was first mentioned by the International Union for Conservation of Nature in 1980 as the term 'sustainable development'. At the World Committee on Environment and Development (WCED), sustainable development is defined as meeting the needs of the present generation, without compromising the likelihood that future generations will meet their needs. The concept of sustainability also includes an environmental concept that focuses on ecological efficiency as well as a question of survival across regions and generations.

In carrying out successful activities as an organization, it is necessary to actively

implement management activities based on the sustainability of the organization. Sustainable activities are closely linked to environmental conservation, which can lead to further development of the next generation. Domestic and overseas leading industries recognize the importance of sustainable development in accordance with social and environmental changes and introduce it as core strategy of industry and organization and carry out it properly. In Korea, since 2003, the need for sustainable development Began to spread.(Park et al.,2010)

Based on this concept of sustainable development, it began to be used in corporate management. When discussing sustainable management, the part of the sustainable management includes three elements: economy, society and environment. This is a situation in which the company is making a harmonious effort to be economically viable, environmentally sound, and socially responsible. Economic responsibility can be evaluated by the compliance of the members of the organization, customers and related companies, the public sector, employees, etc. Social responsibility can be assessed by relations with stakeholder in community activities and charity activities, product liability. Environmental responsibility can be evaluated by environmental policy and environmentally friendly operation. Figure 1 shows the contents of the three sections.(Elkington 1997)



Figure 1 Triple Bottom Line(Elkington, 1997)

Sustainable management is a combination of two concepts of sustainable development and corporate social responsibility. It refers to a form of management in which corporate responsibility is closely linked to management strategies for sustainable development. It is a management activity that pursues the sustainability of the company while considering the economic, environmental, social, and issues that affect the management of the enterprise in a comprehensive and balanced way.(Park et al., 2010)

In a previous study that combined Triple Bottom Line with general company management, Gimenez, Sierra and Rodon(2012) classify the social and environmental programs that authors are conducting in and out of each company, and analyze how these activities affect social, environmental, and economic aspects. As a result, it is argued that social and environmental activities, that are carried out internally by the company, give the company an economic advantage, but doing externally is not alone but with partner companies, which has positive results.

In addition, the concept of Triple Bottom Line(TBL) has been applied to various industries. In terms of port industry, Park, Lee and Jang(2010) have derived twelve factors that combine TBL for sustainable development. This index applied to Korean four major ports. According to the sustainable factors, securing high value cargoes, increasing efficiency of port operation and infrastructure together with financial investment are important to have competitiveness. Kim(2012) suggested sustainable port competitiveness as a comprehensive concept that encompasses economic, social and environmental areas. And the port is not only the center of Global Supply Chain Management(GSCM), but also a geopolitical broader approach than previous studies dealing with port competitiveness as an economic cooperation space that creates value through economic activities of related industries and companies. This emphasized the importance of economic, social and environmental harmonious growth.

2.4 Regression Analysis

Regression analysis is a statistical analysis method used to examine the relationship between independent variables and dependent variables, to determine the influence of independent variables on dependent variables, or to predict changes in independent variables with changes in independent variables. According to the number of independent variables, regression analysis is divided into simple regression analysis which has one independent variable and multiple regression analysis that use two or more independent variables

The reason regression analysis being used could be that it is possible to analyze several causes (independent variables) for results (dependent variables) at once. In addition, regression analysis can analyze the effect of individual independent variables on dependent variables, so that it is easy to judge the extent to how each independent variable contributes to the change of dependent variables when other variables are controlled. On the other hand, it ignores the relation between the independent variables and treats only the single way relationship. In addition, it has a feature that does not recognize a measurement error. Therefore, when regression analysis is for the relatively simple casual model that can overcome the problem of relevance within the independent variables, it is one of the useful statistical techniques to compare the mutual influence of independent variables on the dependent variable.

2.4.1 Structure of Regression Analysis

Creating a regression model in multiple regression analysis, independent variables, which affect the dependent variable, should be included in the regression model. The method of inputting independent variables in multiple regression analysis can be divided into four methods.

2.4.1.1 All Possible Selection

All Possible Selection method is a method of analyzing all independent variables at once. By using this method, researchers can know the influence of specific independent variables under the control of other independent variables, and researchers could also figure out the extent of that all independent variables, which researchers consider, explain the dependent variables at the same time

2.4.1.2 Forward Selection

Forward selection method considers initial model that consists of the model with a constant and adds the variables that are considered to be the most important among the explanatory variables to the model in turn. It is considered that there is no significant explanatory variable to be added anymore after the process of adding variables, and the model is settled by using only the explanatory variables finally selected. The forward selection method has the disadvantage that when the selected explanatory variable become no longer significant due to the addition of other explanatory variables, it cannot be removed.

2.4.1.3 Backward Elimination

Backward elimination method starts with the initial model as a complete model and the method proceed by eliminating unnecessary variables. That is, in the first step, it begins with a regression model that includes all the candidate variables and remove them in turn from the least contributing variables. The backward elimination method has a disadvantage in that the removed explanatory variable cannot be included in the model even if the explanatory variable is needed in the future due to the elimination of other explanatory variables. However, backward elimination method is a relatively safe method because it is rarely to get rid of important variables from the model.

2.4.1.4 Stepwise Selection

Stepwise selection method is considered to overcome the disadvantages of forward selection and backward elimination. The method repeats the process of adding the explanatory variables one by one to the model and eliminating the ones that are not significant due to the explanatory variables added among the explanatory variables in the model. Also method repeats the process until no more variables have to be added or removed. The method is a way of reviewing step by step whether the variables that have already been included in the model can be removed. To sum up, the most optimal model is selected by alternately performing the forward selection method and the backward elimination method.

2.4.2 Statistical Coefficient

2.4.2.1 Standardized Coefficient, (β)

Regression models are constructed using non-standardized coefficients that present the units of independent variables. Thus, since the non-standardized coefficients are affected by the units of measurement of each independent variable, they are not appropriate when comparing the relative contributions of the independent variables. In this case, a comparison can be made using standardized coefficients. The unit and distribution of all independent variables should be unified in order to compare the extent of the influence of several independent variables on the dependent variable. It is the standardized coefficient that the non-standardization coefficient is changed through this process.

Although standardized coefficients cannot be directly used to predict the value of the dependent variable, it is a good standard for determining the relative influence of each independent variable on the dependent variable. In other words, the extent of the relative influence of independent variables on the dependent variable is proportionate to the results of the standardized coefficients.

2.4.2.2 Determination Coefficient

It is necessary to judge whether estimated regression model is really meaningful or not. In other words, it is necessary to examine a regression model that represent the relationship between the independent and the dependent variable, and how well the estimated regression model explains the relationship between the dependent and the independent variable. Determination coefficient is used to judge how well the model explain the results and this statistic result is called Rsquare and indicates the extent to which the independent variable describes the dependent variable.

Determination coefficient results are generally placed inside of the range that is $0 \leq R^2 \leq 1$. The closer the decision coefficient is to 1, the greater the explanatory impact of the independent variable and the higher the fitness of the estimated regression equation. On the other hand, as the value approaches 0, the impact weakens and the fitness decreases. As the number of independent variables increases, the explanatory impact increases. For example, it is common to see that the value of increases, even if an independent variable not significantly related to the dependent variable is added.

In multiple regression models, modified decision coefficients(Adjusted R^2) are used widely. Statistically, the value of the coefficient of determination, obtained from the sample data, tends to be slightly larger than the value of the coefficient of determination for the population. Therefore, the modified decision coefficient is used to compensate for this problem, which is a result that includes the number of samples and the number of independent variables

2.4.3 Multi-Collinearity

The reason is that the independent variables included in the multiple regression model are too closely connected to each other, the analysis result is distorted. This phenomenon is referred to as the problem of multi-collinearity. If the correlation

between the independent variables, input to the regression model, is high, it makes a crucial error in explaining the regression coefficient. In other words, when there are multi-collinearity among the independent variables, there is a big difference in the variables explaining the dependent variables. Therefore, determining whether there are multiple correlations of independent variables is a preliminary preparation to avoid making wrong conclusions about the analyzed results. Although other assumptions are important in multiple regression analysis, the assumption that has the most decisive influence on the conclusion is the multi-collinearity problem. One of the ways to judge multi-collinearity problems in regression analysis is to check the variance inflation factor(VIF). This value is an index for the multi-collinearity because it means an increase in the variance of each regression coefficient. When the VIF value approaches 1, it is judged that there is no multi-collinearity. If this value is more than 10, it should be regarded as multi-collinearity.

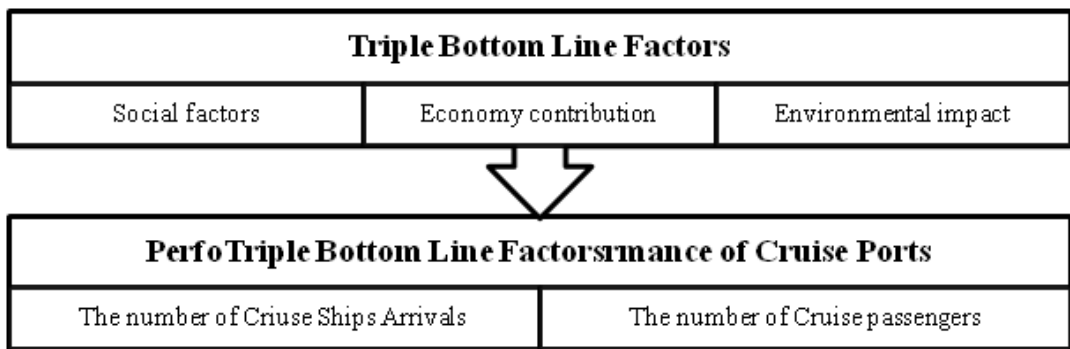
2.4.4 Determination of Significance

In the multiple regression model, when the F value is significant, one or more independent variables significantly explain the dependent variable. However, the F value does not show which independent variable is a statistically significant independent variable. Therefore, it is essential to verify the significance of individual regression coefficients in the multiple regression model. Verification of significance for individual regression coefficients can be generally identified by using confidence intervals. The criterion for the confidence interval is generally 95%. According to the researchers, the criterion could be set a 90% confidence interval on a more flexible basis or a 99% confidence interval on a more conservative basis. However, since the statistical significance level accepted by social science is 5% (0.05), the 95% confidence interval is usually applied to determine the significance. This means that an error of 5% is acceptable.

Chapter 3 RESEARCH MODEL AND RESULTS OF REGRESSION ANALYSIS

3.1 Research Model

This study was carried out to examine that the Triple Bottom Line(TBL) factors, which include social factors, economy contribution and environmental impacts, could influence the performance of cruise ports according to the background studies and the TBL factors have been collected for 15 years. The factors are chosen through the prior studies, which suggested the hinterland's transportation state as the effects of social field, the index of water pollution as environmental factors and the ports and tourism infrastructure for economic contribution. From this, we thought TBL factors could affect the management performance of cruise ports and each of those factors will independently influence the outcome of cruise ports. Before analyzing the influence of the triple bottom line factors on the cruise port, which could make cruise ports more sustainable and would help to make sustainable development strategies for the ports, the research model was constructed with the assumption that TBL factors affects the performance of cruise ports and the model could be as shown in <Figure 2>.



<Figure 2 The research model with triple bottom line>

According to the basic research model, this study examines the impacts of cruise port and port competitiveness factors on economic, environmental and social factors based on Triple Bottom Line and cruise port performance. Through the background studies, classified economic, social, and environmental factors, analyzed correlation and ANOVA, and finally performed time series multi-regression analysis. Therefore, to figure out the relation between the performance of cruise ports and Triple Bottom Line factors, the regression analysis model could be the following model.

$$Y = \beta_0 + \sum_{f=1}^n \beta_n f_n + \sum_{s=1}^m \beta_m * s_m + \sum_{e=1}^l \beta_l * e_l$$

Y = the performance of the cruise ports

$$\sum_{f=1}^n \beta_n f_n = \text{economic factors of TBL}$$

$$\sum_{s=1}^m \beta_m * s_m = \text{social factors of TBL}$$

$$\sum_{e=1}^l \beta_l * e_l = \text{environmental factors of TBL}$$

(1)

The input variables of the multi-regression analysis are the factors related to infrastructures of the cruise ports, tourism industries and market size of the related area for economy contribution of cruise ports, elements that represent the transportation of the related city, and the states of the city as social factors and environmental impacts express the extent of water pollution of the port and coast near the port.

3.2 Data

The data used for the analysis was obtained from Busan Port Authority, Incheon Port Authority, Jeju Port, and Korean Statistical Information Service (<http://kosis.kr>).

The data period is 15 years from 2001 to 2015, and the total number of observation is 720, with annual frequently. The data includes the variables that could explain the TBL elements in Busan, Incheon, and Jeju port and each hinterland. The variables are classified into Triple Bottom Line's three categories, which are social, economy and environmental factors and the factors are expressed as following.

Table 3 Triple Bottom Line Factors

Triple Bottom Line	Economic Factors	Number of travel agency
		Number of tourist facilities business
		Number of cruise specialized berth
		Per capita GRDP (Gross Regional Domestic Product)
		Number of large shopping mall
	Environmental Factors	Chemical Oxygen Demand (COD)
		Number of pollution incidents caused by accident
	Social Factors	Number of Air flights
		Number of air flight passengers
		Rate of Employment

Some of the descriptive statistics demonstrate the difference between Busan Port, Incheon Port and Jeju Port. In the performance of cruise ports, Jeju has the highest number of cruise ships arrivals and cruise passengers. On the other hand, the number of entering and departing vessels and the volume of cargoes which is included in economic factors are high in the Busan and Incheon. Through this, it was found that Jeju is the biggest cruise port. Also this could be persuasive because according to the statistics, Jeju is highly ranked at the average of number

of travel agency, tourist accommodation business and tourist facilities business which are on the social impact. Furthermore, Busan is placed second at the number of travel related industry.

In the environment impact, Busan has the worst water pollution in coast and port while Jeju is the most pristine port and the near shore. The actual values are shown the following table 4.

Table 4 Descriptive Statistics of Variables

Variables	Ports	Average	Standard Deviation
Number of cruise ships arrivals	Busan	57.40	44.317
	Incheon	28.53	46.431
	Jeju	77.33	92.304
Number of cruise passengers	Busan	61671.40	68038.670
	Incheon	33579.87	62979.660
	Jeju	131387.00	201837.495
Number of cruise specialized berth	Busan	252848.000	63700.4541
	Incheon	135627.000	13994.6961
	Jeju	4448.200	1927.2934
Number of large shopping mall	Busan	202190.27	82109.453
	Incheon	84699.27	17812.962
	Jeju	2702.20	478.164
Number of travel agency	Busan	855.67	245.137
	Incheon	303.67	142.981
	Jeju	481.00	301.061
Number of tourist facilities business	Busan	20.40	8.492
	Incheon	11.33	9.678
	Jeju	44.80	27.340
Per capita gross regional domestic product (GRDP)	Busan	16695.47	3773.551
	Incheon	19594.07	3889.615
	Jeju	18251.93	4547.158
Rate of	Busan	55.540	.9187

employment	Incheon	59.480	1.0884
	Jeju	68.687	1.4292
Number of air flights	Busan	63944.13	10636.528
	Incheon	201479.67	63299.389
	Jeju	99610.33	29154.881
Number of air passengers	Busan	8079163.53	2262097.129
	Incheon	29189622.93	11359708.230
	Jeju	14473267.33	5506129.349
Chemical Oxygen Demand (COD)	Busan	1.2273	.44866
	Incheon	1.5060	.17860
	Jeju	.784667	.2600787
Pollution incidents caused by accident	Busan	70.20	17.064
	Incheon	22.07	8.224
	Jeju	21.00	11.982

3.3 Analysis of Correlation

Correlation is very important as a key concept in providing a basis for operational principle of multiple regression analysis. It is an analysis method for analyzing the correlation between variables. Therefore, it can be said that the regression analysis shows how reliable the relation between variables is. For this reason, correlation analysis is essential for regression analysis. When the correlation analysis is completed successfully, results are shown simply by the following Table 2. The table shows the correlation between cruise management performance factors and TBL factors. To begin with, the economic factors of TBL are significant in correlation with cruise port performance. Per capita Gross regional domestic product (GRDP) and Income per capita city are the factors that influence the improvement

of cruise port outcome. This means that economic factors do affect the growth of cruise port performance.

On the other hand, in social factors, there is a positive correlation with cruise performance factor and the social impact which are the number of travel agency, the number of tourist accommodation business, the number of tourist facilities busines. It can be seen that as the size of the related city's tourism infrastructure grows, the performance of the management also increases.

On the top of that, in the environmental factor, the chemical oxygen demand is negatively related to all the cruise management performance factors. Chemical oxygen demand, which indicates the water pollution level of each port, shows that environmental factors have an important influence on cruise management performance.

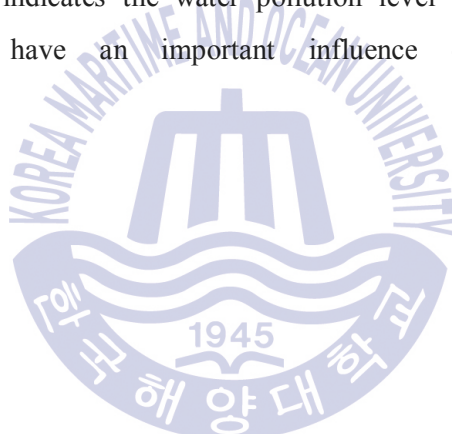


Table 5 The Correlation between Factors of Cruise Performance and Triple Bottom Line

	A1	A2	F1	F2	F3	F4	F5	E1	E2	S1	S2
A2	.948										
F1	.133	.107									
F2	.665	.637	.224								
F3	.032	-.090	.780	.186							
F4	.646	.556	.517	.409	.529						
F5	.716	.763	-.056	.498	-.376	.433					
E1	.163	-.229	-.752	.051	-.043	-.907	-.371	.488			
E2	-.145	.159	.066	.660	.083	-.271	-.018	.028			
S1	.202	.214	.064	.622	.303	-.253	.041	.085	.941		

S2	-0.345	-0.327	.229	-0.233	-0.334	-0.287	-0.560	-0.487	.313	.302	
S3	-0.158	-0.241	.446	-0.485	-0.200	.409	-0.328	-0.615	-0.603	-0.600	.118

Cruise Management Performance		A1 : Number of Cruise Ships Arrivals									
		A2 : Number of Cruise Passengers									
Triple Bottom Line	Economic Factors	F1 : Number of Cruise specialized berth									
		F2 : Gross regional domestic product per capita (GRDP)									
		F3 : Number of large shopping mall									
		F4 : Number of travel agency									
		F5 : Number of tourist facilities business									
	Environmental Factors	E1 : Chemical Oxygen Demand(COD)									
		E2 : Pollution incidents caused by accident									
	Social Factors	S5 : Number of air flights									
		S6 : Number of air passengers									
		S7 : Rate of employment									

3.4 Analysis of Significance of TBL Models in Cruise Performance by TBL Factor

Once a regression model including the above independent variables and dependent variables was constructed, the effectiveness of regression model's explanation was analyzed through analysis of variance and model summarization to test suitability.

3.4.1 Analysis of Significance of Triple Bottom Line Model

Table 6 Analysis of F-test for Triple Bottom Line Model

		Sum of squares	Degree of freedom	Mean Square	F	Significant Probability
Number of cruise ships arrivals	Regression Model	99989.198	10	99989.198	45.245	.000
	Residual	95027.780	34	2209.948		
	Total	195016.978	44			
Number of cruise passengers	Regression Model	5.862	10	5.862	11.039	.000
	Residual	1.806	30	5.310		
	Total	34	44			

Table 7 Analysis of Triple Bottom Line Model

	R	R squared	Adjusted R squared	Standard error of estimated value
Number of cruise ships arrivals	.716	.653	.551	47.010
Number of cruise passenger	.874	.765	.695	72872.021

Significant factors for Number of Cruise Ships Arrivals : Number of tourist facility business, number of travel agency, number of large shopping mall, and number of air passengers.

Significant factors for Number of Cruise Passengers : Pollution incidents caused by accident, number of travel agency, number of large shipping malls, and number of air passengers.

The result of the above table shows that the multiple regression analysis model including environmental, social and economic factors is significant. The value of R-squared decision coefficient, which accounts for the explanatory ability of the regression equation, is 0.653 and 0.716, which means that independent variables are 65.3% and 71.6%, respectively, for the two dependent variables for the degree of success of the model. In addition, according to the Table 6, statistically significant results are obtained because the above table is variable significance for regression analysis through analysis of variance.

3.4.2 Analysis of Significance of the Economic Factors' Model of TBL

Table 8 Analysis of F-test for Economic Factors' Model of TBL

		Sum of squares	Degree of freedom	Mean square	F	Significant probability
Number of cruise ships arrivals	Regression Model	144575.956	5	28915.191	22.357	.000
	Residual	50441.022	39	1293.360		
	Total	195016.978	44			
Number of cruise passengers	Regression Model	4.469	5	4.469	60.090	.000
	Residual	3.198	39	7.438		
	Total	7.668	44			

Table 9 Analysis of Economic Factors' Model of TBL

	R	R squared	Adjusted R squared	Standard error of estimated value
Number of cruise ships arrivals	.861	.741	.708	35.963
Number of Cruise passengers	.763	.583	.573	86242.371

From the above table, it can be seen that the economic factors explain the dependent variable, cruise harbor performance factor. The R-squared value is bigger than 0.4, and the F-test value of the multiple regression equation for the influence of the economic factors on the number of cruise ships and the number of passengers, which are dependent variables, is significant. Therefore, regression equations for economic factors are significant and explanatory ability is sufficient.

3.4.3 Analysis of Significance of the Environmental Factors' Model of TBL

Table 10 Analysis of F-test for Environmental Factors' Model of TBL

		Sum of Squares	Degree of freedom	Mean square	F	Significant Probability
Number of cruise ships arrivals	Regression Model	33808.225	3	11269.408	2.866	0.048
	Residual	161208.753	41	3931.921		
	Total	195016.978	44			
Number of cruise passengers	Regression Model	1.288	3	4.293	2.759	0.049
	Residual	6.680	41	1.556		
	Total	7.668	44			

Table 11 Analysis of Environmental Factors' Model of TBL

	R	R squared	Adjusted R squared	Standard error of estimated value
Number of cruise ships arrivals	.345	.119	.098	63.220
Number of cruise passengers	.327	.107	.086	126177.044

From the above table, it can be seen that the environmental factors have a relatively low explanatory power for the dependent variable, the cruise port performance factor. The value of R squared is less than 0.4, but the value of F test is 0.48, 0.49. Therefore, the regression equation for the impact of environmental factors on cruise port performance is significant but lacks explanatory ability.

3.4.4 Analysis of Significance of the Social Factors' Model of TBL

Table 12 Analysis of F-test for Social Factors' Model of TBL

		Sum of Squares	Degree of freedom	Mean square	F	Significant Probability
Number of cruise ships arrivals	Regression Model	160702.292	4	26783.715	29.660	.000
	Residual	34314.686	40	903.018		
	Total	195016.978	44			
Number of cruise passengers	Regression Model	6.141	4	1.024	25.479	.000
	Residual	1.526	40	4.017		
	Total	7.668	44			

Table 13 Analysis of Social Factors' Model of TBL

	R	R squared	Adjusted R squared	Standard error of estimated value
Number of cruise ships arrivals	.762 ^c	.580	.560	44.138
Number of cruise passengers	.701 ^c	.492	.468	96307.795

Social factors are included in the above table. Multiple regression analysis model of the factors is significant. The significance of the determinant R for the explanatory ability of the regression equation is 0.580 and 0.492, which means that the independent variable has an influence of 58% and 49.2% on the two dependent variables. In general, it is judged that the value of the square of R is 0.4 or more enough to explain the regression analysis. In addition, we can see that statistically significant results are obtained because the above table has a significance probability of 0.0 for regression analysis through analysis of variance.

3.5 Influence of TBL Factors on the Performance of Cruise Port

3.5.1 Triple Bottom Line Factors to Number of Cruise Ships Arrivals

Table 14 Influence of TBL Factors to Number of Cruise Ships Arrivals

Model	Unstandardized Coefficients		Standardized Coefficients	T value	Significant Probability
	B	Standard error			
(Constant)	-54.961	15.541		-3.537	00.1
Number of tourist facilities business	.447	.499	.149	.895	.037
Number of travel agency	.184	.039	.910	4.740	.000
Number of air passenger	2.551	.000	.441	4.545	.000
Number of large shopping mall	1.835	.799	.410	2.297	.027

Of the total 14 TBL elements, four factors affect the number of cruise ships arrivals. Among the significant results, it was found that all four factors which are number of tourist facilities business, number of travel agency, number of air passenger, and number of large, have positive impact on the number of cruise

ships being in the port. This reveals the need to invest more in infrastructure not only for the ports but also for tourists' convenience. Also, from the consequence of the table, the regressive equation that measures the effects of the factors to arrivals of cruise ships.

$$Y_{TBL1} = -54.961 + 0.447x_{e2} + 0.184x_{e1} + 2.511x_{s1} + 1.835x_{e5} \quad (1)$$

3.5.2 Triple Bottom Line Factors to Number of Cruise Passengers

Table 15 Influence of TBL Factors to Number of Cruise Passengers

Model	Unstandardized Coefficients B	Standard error	Standardized Coefficients	T value	Significant Probability
(Constant)	-100959.356	29994.303		-3.366	.002
Number of large shopping mall	5788.614	859.541	.652	6.735	.000
Number of travel agency	411.191	40.046	1.027	10.268	.000
Number of air passenger	.006	.001	.497	5.859	.000
COD	-6056.123	3305.059	-.261	-1.832	.075

Among the 10 social, economic and environmental factors for the number of cruise tourists, which is one of the performance factors, it could derive results that four factors are significant to cruise management performance. The four elements consists of two economic factors and one for each social and environmental factors. The economic factors are the elements showing how well the infrastructures of tourism business exists in the city related port. Through the social effects, the

importance of transportation with air port in the related city should be included in the list of sustainable development for Korean cruise ports. Also, the environmental factor is associated with water pollution, and it was found that the deterioration of water pollution had a negative impact on the number of cruise tourists. In this regard, it was found that the environment should be considered for sustainable tourism as well as tourism industry in the hinterland. From the results above, the multiple regression equation could be come out.

$$Y_{TBL2} = -1000959.356 + 5788.614x_{e5} + 411.191x_{e2} + 0.006x_{s2} - 6056.123x_{ev1} \quad (2)$$

3.5.3 Economic Factors of Triple Bottom Line

Table 16 Influence of Economic Factors to Number of Cruise Ships Arrivals

Model	Unstandardized Coefficients		Standardized Coefficients	T value	Significant Probability
	B	Standard error			
(Constant)	-108.742	24.840		-4.378	.000
Gross regional domestic product per capita (GRDP)	.007	.001	.467	5.265	.000
Number of large shopping mall	1.842	.427	.411	4.316	.000
Number of travel agency	.136	.021	.673	6.559	.000

a. Dependent variable : Number of cruise ships arrivals

According to the results, gross regional domestic product per capita, number of travel agency and number of large shopping mall is left in the model. This means that those factors significantly influence the number of cruise ships arrivals with positive effect. Among the economic factors of TBL, the elements related to tourism infrastructures and the factors showing market size of the hinterland are meaningful to fluctuation of number of cruise ships arrivals. In this regard, those economic aspects is the biggest explanatory power of cruise port. Also According to the results, the equation could be made as follows.

$$Y_{E1} = -108.742 + 0.007x_{e3} + 1.842x_{e5} + 0.136x_{e1} \tag{3}$$

Table 17 Influence of Economic Factors to Number of Cruise Passengers

Model	Unstandardized Coefficients		Standardized Coefficients	T value	Significant Probability
	B	Standard error			
(Constant)	-215751.570	52041.239		-4.146	.000
Number of tourist facilities business	3145.748	608.514	.530	5.170	.000
Gross Regional domestic product per capita	9.100	3.209	.287	2.836	.007
Number of travel agency	82.405	39.028	.208	2.137	

a. Dependent variable : Number of cruise passengers

The above table shows the effect of economic factors on the number of cruise passengers. According to the results, gross regional domestic product per capita, number of travel agency and number of large shopping mall are significantly regarded to

number of cruise passengers. In this point of view, the tourism infrastructure and market size of the hinterland should be considered importantly to attract more tourist from cruise tour. According to the table above, the equation of the regression could be as follow :

$$Y_{E2} = -215751.570 + 3145.748x_{e2} + 9.100x_{e3} + 82.405x_{e1} \quad (4)$$

3.5.4 Environmental Factors of Triple Bottom Line

Table 18 Influence of Environmental Factors to Number of Cruise Ships Arrivals

Model	Unstandardized Coefficients		Standardized Coefficients	T value	Significant Probability
	B	Standard error			
(Constant)	116.808	27.579		4.235	.000
COD	-53.200	22.103	-.345	-2.407	.020

a. Depenet variable : Number of cruise ships arrivals

Among the environmental factors of TBL, the chemical oxygen demand to measure the water pollution level at the port and near shore is found to have the greatest impact on the number of cruise ships arrivals. The factor could influence number of the cruise ships arrivals negatively. Therefore, this means that as water pollution become worse with increasing of COD, the cruise arrivals will gradually decrease. Also, from the consequence of the table, the multiple regression equation

that measures the effects of the factors to arrivals of cruise ships.

$$Y_{EV1} = 116.808 - 53.200x_{ev2} \quad (5)$$

Table 19 Influence of Environmental Factors to Number of Cruise Passengers

Model	Unstandardized Coefficients		Standardized Coefficients	T value	Significant Probability
	B	Standard error			
(Constant)	193066.611	55043.687		3.508	.001
COD	-100216.477	44113.318	-.327	-2.272	.028

a. Dependent variable : Number of cruise passengers

According to the above table, chemical oxygen demand is left in the model as the most meaningful factor among the environmental factors. From this result, it could be regarded that the chemical oxygen demand has great effect on the number of cruise passengers among environmental factors. From the results above, the multiple regression equation could be come out as follows.

$$Y_{EV2} = 193066.611 - 100216.477x_{ev2} \quad (6)$$

3.5.5 The Social Factors of Triple Bottom Line

Table 20 Influence of Social Factors to Number of Cruise Ships Arrivals

Model	Unstandardized Coefficients		Standardized Coefficients	T value	Significant probability
	B	Standard error			
(Constant)	-151301.555	30361.175		-4.983	.000
Rate of employment	3506.144	554.644	.591	6.321	.000
Number of air passengers	.003	.001	.283	3.254	.002

a. Dependent variable : Number of cruise ships arrivals

From the above table, it can be seen that among the TBL social factors, the significant variables are rate of employment and number of air passengers in the city near the ports. This shows that those two variables have the greatest influence on the cruise arrivals as a social factor of the triple bottom line. The rate of employment shows that how well the city related to the port is stable. Also, as the number of air passenger increase, many people use airport in the related city and also this could present the size of the international airport in the city. As the fly & cruise is the trend of cruise tourism these days, the international airport is considered importantly. According to the results, the equation could be made as follows.

$$Y_{S1} = -151301.555 + 3506.144x_{s2} + 0.003x_{s3} \quad (7)$$

Table 21 Influence of Social Factors to Number of Cruise Passengers

Model	Unstandardized Coefficients		Standardize Coefficients	T value	Significant Probability
	B	Standard error			
(Constant)	-290.690	101.420		-2.866	.007
Rate of employment	3.423	1.562	.292	2.191	.034
Number of air passengers	.005	.000	.355	4.320	.000

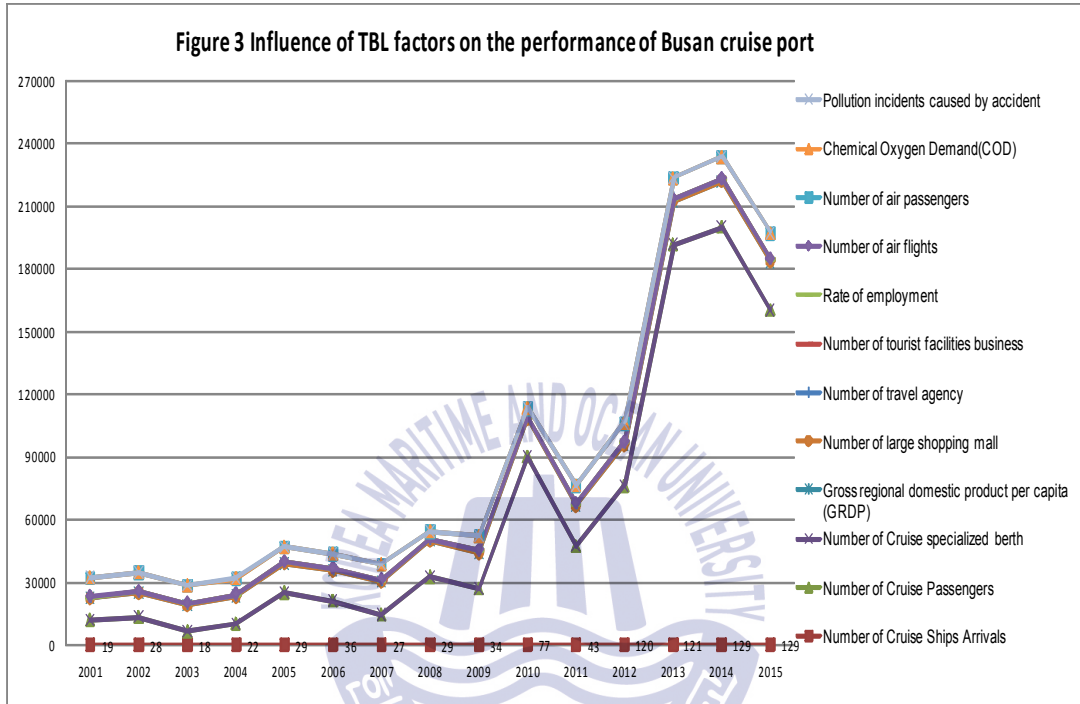
a. Dependent variable : Number of cruise passengers

According to the result of social impact on number of cruise passengers, number of air passengers and rate of employment are regarded as important factors to increasing the number of cruise passengers in the social area. Many cruise passengers come from various regions so that they need airport to approach to the cruise port. From this reason, the result reflect the needs of international airport. The significance of factors presents that the social impacts have positive effect on the number of cruise passengers. According to the table above, the equation of the regression could be as follows.

$$Y_{E2} = -290.690 + 3.423x_{s2} + 0.005x_{s3} \quad (8)$$

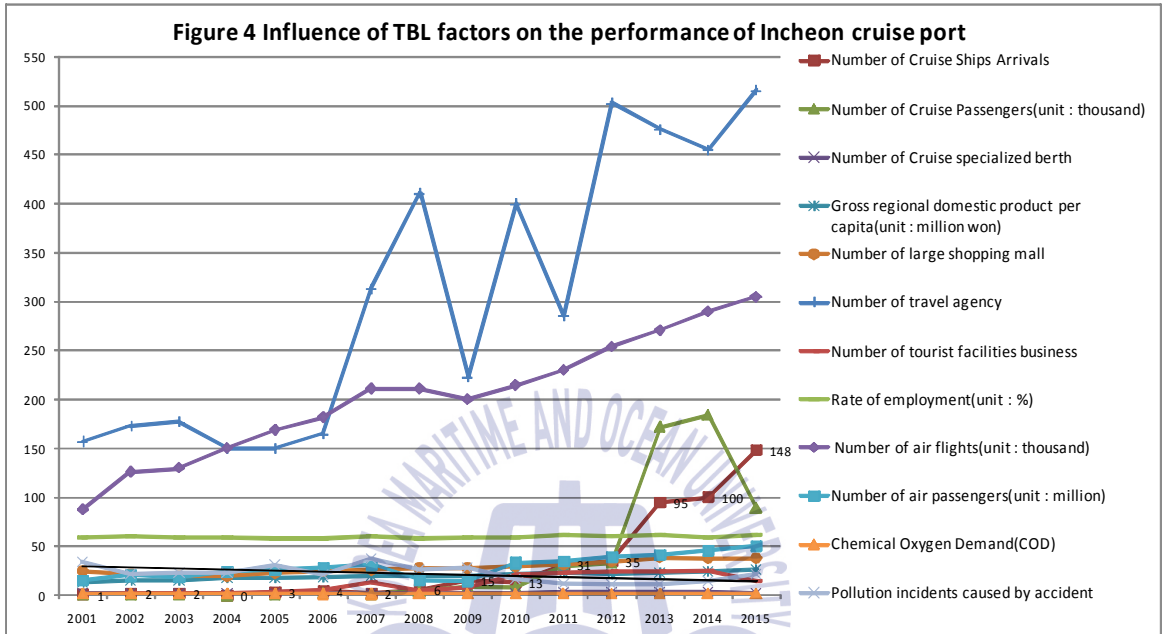
3.6 Influence of TBL Factors on the Performance of Cruise Port

3.6.1 Influence of TBL Factors on the Performance of Busan Cruise Port



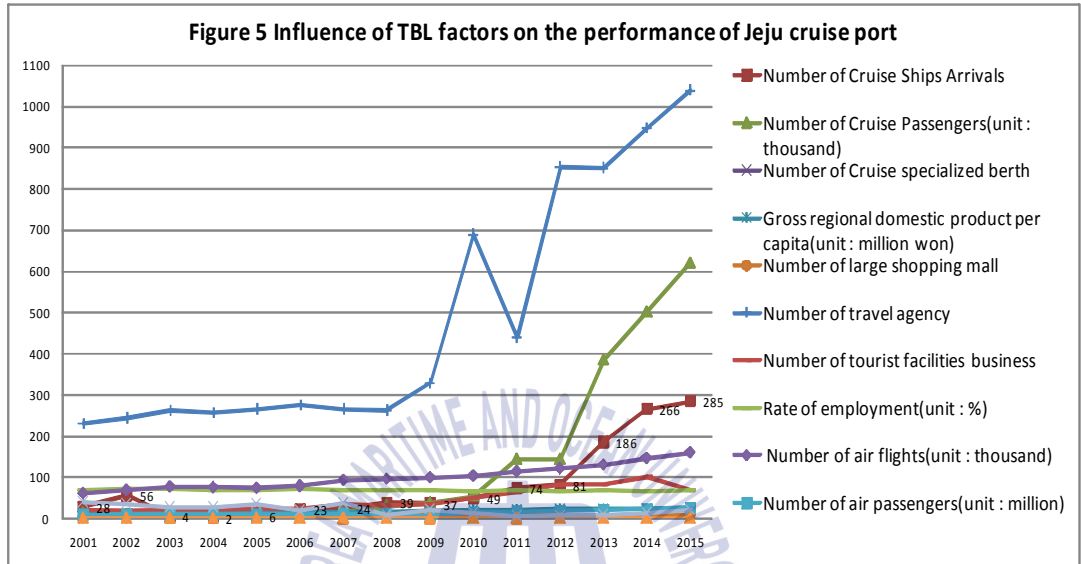
The above chart shows how the performance of Busan Cruise Port varies with the increase and decrease of TBL factors. The above result shows that social, economic and environmental factors are changing together. Especially, it is found that there is a correlation between the increase of environmental pollution degree and the decrease of pollution level together with a decrease in the performance. The figure also shows a steady increase in the number of large shopping malls, which means that most tourists spend the most money in shopping while they stay in the cruise port. (Korea Culture & Tourism Research Institute, 2006-2015). The economic factors such as the expansion of the cruise infrastructure and the change in the market size of the related city have also been confirmed to be similar to changes in Busan cruise port performance.

3.6.2 Influence of TBL Factors on the Performance of Incheon Cruise Port



In cruise port of Incheon, the results of TBL factors and harbor performance showed similar increase. Although the extent and flow of increase and decrease in the cruise port performance of Incheon and the TBL factors are somewhat different, the overall trend is showing an upward trend. The reason why the flow looks slightly different than Busan is that the development and developing strategies of cruise port in Incheon was late compared to cruise port of Busan or Jeju. Incheon started to expand and construct ports dedicated to cruise until 2012 when Incheon Port started. However, it was found that the performance increased with the geographical location close to China, which occupies most of the cruise inbound passengers in Korea, and the infrastructure development of port and rear city.

3.6.3 Influence of TBL Factors on the Performance of Jeju Cruise Port



Jeju, which was famous as a tourist destination in Korea, basically had more tourism infrastructure than other cities. However, tourism infrastructure and cruise infrastructure have increased to deal with soaring cruise tourists. In addition, the trends of social, environmental, and economic factors and harbor performance trends are both increasing. Cheju Island had fewer shopping malls compared to other cities. It could be that the proportion of shopping is low in Jeju, because tourists spend a lot of time looking around nature landscapes compared to other cities and also the tourist packages are also focused on the sightseeing not go around shopping.

Chapter 4 CONCLUSION

4.1 Summary and Conclusion

The demand for cruise tourism in Aisa has risen sharply compared to other regions, with the improvement of economic level in Northeast Asia including Korea. Therefore, the Korean government is actively seeking to revitalize cruise tourism, and is actively investing in cruise terminals. The Ministry of Maritime Affairs and Fisheries, has announced in the 3rd Port Basic Plan (2011-2020), that it will operate 7 cruise ports and cruise 9 berths by 2020. It aims to enhance the service for cruise ships and passengers by effective capacity expansions of existing and new cruise terminals.

In this study, the influence of three elements of Triple Bottom Line in Busan Port, Incheon Port, and Jeju Port, which are currently the major cruise ports in Korea, is analyzed.

In the light of enormous initial investments required in the development of cruise ports and terminals, the sustainability of the cruise terminals has a vital importance for the entire national economy. This study has analyzed the sustainability of three major Korean cruise ports from the Triple Bottom Line(TBL) viewpoint, which is the well-known framework to integrate the triple dimensions of economic, environmental, and social factors. A multiple linear regression model has been developed to show the influences of the TBL factors on the performances of cruise ports. All the independent variables are grouped to form a set of the TBL factors, and the impacts of those factors on the dependent variables are analyzed.

In this study, the number of cruise ships entering the ports and the number of tourists coming through the cruise ship were determined as dependent variables. The independent variables were divided into three groups: social, economic, and environmental. The economic sector variables are selected to reflect the infrastructure of the port and the economic scale and tourism infrastructures of the

nearby cities. The selected social factors show the connection between the port and the nearby airports, and the impact of the cruise port on the community. The environmental factors are related to the degree of water pollution of the sea adjacent to the port and the surrounding areas. Multiple regression analysis was conducted to investigate the effect of all these variables on the performance of cruise ports. In a comprehensive regression analysis, it has been found that the TBL factors have significantly affect the cruise port performance. It is also possible to recall factors by multiple regression analysis independently for each of the three TBL sectors in order to determine which of those social, economic, and environmental independent variables are most important in the development of sustainable cruise ports.

This study has shown that the Triple Bottom Line(TBL) factors, as a whole, positively affect the performances of the cruise ports. Some detailed TBL factors like number of travel agency, number of tourist facility business, and number of lager shopping mall in the economy, the chemical oxygen demand in the environment, and rate of employment, and number of air passengers in the society have shown especially remarkable impacts on the cruise port competitiveness. For the sustainable development of the cruise port, it is also found that the environment-friendly operation of the harbor, the environments of the hinterland cities, and the social and economic factors of the cities are closely related to the major competitiveness of a cruise port.

Among the significant factors, number of travel agency and number of air passengers are the most influential to the number of cruise ships arrivals. number of large shopping malls and number of travel agency exert their influence to the number of cruise passengers. This result could be accepted as cruise liners would preferentially consider the cruise tourism infrastructures and the connection between international airports and the cruise ports. The cruise lines need those facilities to attract the customers and to provide convenience to their customers. However, in

the view of cruise passengers, the passengers who visit Korea mostly consist of Chinese. According to the research of Korean Culture and Tourism Institute, the Chinese passengers usually are found to spend on shopping. In this regard, they would need nearby shopping malls, and they also would choose the ports close to international airports for their convenience of transportation.

However, the environmental factors are significant only for the number of cruise passengers. Although the factor is meaningful to the cruise passengers, it be pushed back on the priority list. The factor is on the list but it has less effect than other factors because it is not the direct factors. For instance, if the port and the adjacent sea have serious water pollution problems, it could ruin the general landscape and so passengers to visit the ports would decrease.

4.2 Limitations and Future Research Directions

This study is confined to the major cruise ports of Korea with limited time series data currently available for study. A more comprehensive study with more variables and data from wider range of international cruise ports could be a subject for a possible future extension of this study. In addition to developing sustainable cruise ports, we must also continually manage and develop the sustainability of cruise ports. To do this, we review and develop evaluation indexes on cruise port sustainability related indicators and use them to secure and enhance the competitiveness of ports dedicated to cruise ships.

Reference

Clare Weeden and Jo-Anne Lester, Maree Thyne, 2011, Cruise Tourism : Emerging Issues and Implications, Journal of Hospitality and Tourism Management 18, 26-29

Choe Yunseok, Kim Insin, 2016, "Derivation of Selection Factors of Cruise Home port in Asia Using Delphi Technique", Korean Journal of Tourism Research 31(8),

Cristina Gimenez, Vicenta Sierra, Juan Rodon, 2012, "Sustainable operations: Their impact on the triple bottom line", International Journal of Production Economics Volume 140, Issue 1

Dongkyu Na, Jeongwon Lee and Youngjoo Na, 2014, "Relationship of TBL Component in Corporate Sustainable Management of Fashion Company with Company Evaluation and Brand Image", Fashion & Textile Research Journal Volume 16, Issue 2,

Ho Park, Joo-ho Lee, Hyun-mi Jang, 2016, "A Study on the Sustainability Assessment of Ports using TBL (Triple Bottom Line)", Journal of Korea Port Economic Association 32(4),

In Soo Ha, Ae Joo Lee, 2002, "An Empirical Study on the Development Direction of the Cruise Port Infrastructure in Korea", Korean Journal of Hospitality & Tourism 11(2),

Jasmine Siu Lee LAM, Eddy VAN VOORDE, 2012, Green Port Strategy for Sustainable Growth and Development, Transport Logistics for Sustainable Growth at a New Level, International Forum on Shipping, Ports and Airports (IFSPA)

Jean-Paul Rodrigue, Theo Notteboom, 2013, The geography of cruises: Itineraries, not destinations, Applied Geography Volume 38,

Junho Jang, Bumyoung Huh and Ikjoon Chung, 2011, Status and Futuristic

Strategy of Cruise Tourism Industry in Korea, Journal of Korea Port Economic Association, Vol.27 No.4

Kim Kyunghee, Choi Myoungsik, 2011 "Study for Design Management of Company through Analysis of Community Implementation Elements(3C, 3P, 3R) of SustainableDevelopment and Fusion of Triple Bottom Line", Journal of Digital Design. Abbr : KDDA., vol.11, no.3,

Kwan Jeong-sook, 2012, "Based on the Perspective of Sustainability, the Characteristics of Upcycle Fashion Design "Sustainability" and buzzword as in many area", Fashion & Textile Research Journal Volume 14, Issue 1

Lee Jae-dal, Ryu Jung-sub, 2013, "A study on Sustainable Cruise Tourism and Its Impacts>", Journal of Korea Port Economic Association 29(2),

Lee Choong-bae, Lee Jong-koo, Noh Jin-ho, 2013, " A study on Key Successful Factors of Cruise Port", Journal of Korea Port Economic Association 26(4),

Lee Kyong-Mo, Lee Hyun-Ju, 2016, "Integrating modified IPAs to define quality improvement strategies of Busan cruise port", Korean Journal of Tourism Research 31(6)

Lee Hyung Wook, 2012, 항만경쟁력에 영향을 미치는 요인분석, Korean Public Administration Quarterly 24(1)

Maria B. Lekakou, Athanasios A. Pallis, George K. Vaggelas, 2009 "WHICH HOMEPORT IN EUROPE: THE CRUISEINDUSTRY'S SELECTION CRITERIA", INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF TOURISM Volume 4, Number 4

Naci Polata, 2015, "Technical Innovations in Cruise Tourism and Results ofSustainability", Social and Behavioral Sciences 195

SeymaBayazit, Albert Sune, Levent Kirval, 2015, "Main Factors to Select a Cruise Homeport in the Mediterranean Region: A Perspective from the Cruise

Industry Agents", Logistics, Informatics and Service Sciences (LISS), 2015 International Conference

Park et al., 2008, "The effects of corporate efforts for the sustainable management on the product evaluation: The mediating role of trust and reciprocity perception Marketing Management Study 15", Journal of Marketing Management Research, Vol.15 (3)

Sihyun Kim, 2015, "Sustainable Port Competitiveness in International Port Operations", Journal of Korea Port Economic Association 31(3)

Yang Jeong-Cheol, Kang Sook-Young, Hwang Kyung-Soo, 2015, "A Study on Attribute factors and Priority for a Cruise Home Port by Using AHP", JOURNAL OF TOURISM&LEISURE RESEARCH 27(10)

Yang Ji-Sun, 2012 "Concept model for Sustainable Design Strategy : A comparison of the TBL model and the Sustainability 2.0", Archives of Design Research 25(1), 2012.02

Maria B. LEKAKOU, arhanasios A. PALLIS, Maria N. PAPADOPOULOU, 2005, "Plain Cruising? The State of The Cruise Industry in Greece and EU Policy Developments", International, Association of Maritime Economics(IAME) Conference p.313.

Vaffelas G.K., 2011, "Cruise Tourism: Economic Benefits, Sustainable Development and Port-City relations', Plan Bleu Regional Seminar - Tourism and sustainable development in the Mediterranean, Genoa, Italy

Acknowledgments

I would like to express my deep sense of gratitude to my supervisor, Professor Seong-Cheol Cho for his precious comments and recommendations. Without his advice and patience, this research would have not been possible. His advice and guidance has made my successful graduation. He always have had great patience and trusted in everything I did and he make me go to right way in every time. He always have been like a good life teacher. He always believed and led students with the right-minded personality. I am very proud that I have been one of his students. I give my special thanks to Professor Dong Keun Ryoo and Professor Jong Kwan Rim. They also gave me a lot of help and many useful advices for this thesis with great interest.

Last but not least, I would like to thank all the professors in Korea Maritime and Ocean University that passed on knowledge to me. I also want to thank you all the staff of Department of KMI-KMOU Cooperative program, they always cheered for me and I could finish the master course happily because of them.