Survey and Research on the Formation Mechanism of Port Company's International Competitiveness

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Abstract: Based on the theoretical model of the formation mechanism of port company's international competitiveness from the perspective of Resource-based View, this paper confirms that the enterprises under survey for the empirical research of the model are the port companies listed either in Shanghai, Shenzhen or Hong Kong through a pilot survey, and the data needed for empirical research are collected through dual channels. Among the 37 measures within the theoretical model, 31 are obtained by questionnaire survey and the rest 6 are extracted from the annual report of the listed port companies. Thus, all the data needed for empirical research on the formation mechanism model of port company's international competitiveness is well-accomplished for collection.

Keywords: Port company; International competitiveness; Theoretical model; Questionnaire survey; Objective data

1. Introduction

The development of globalization makes the rapid growth of shipping trade, which promotes the rapid development of the port industry in the transport chain and gradually becomes an important linkage in the whole transport chain. At the same time, the development of globalization leads to the intensification of global market integration and global competition, which also has a great impact on the operation and management of port company and puts forward new requirements for port company management. In the competition, port companies can find that it is hardly possible to distinguish many new competition dynamics only by their own traditional experience, therefore, port companies must re-examine the original business operational model and strategic positioning in the new situation, grasp the key elements of enterprise development, and conduct process reengineering in management, use systematic and scientific management theory and method, starting from the actual need of comprehensively enhancing enterprise competitiveness, formulate the development strategy plan in line with the current competitive environment, so as to better meet the needs of shippers and transportation enterprises.

2. Theoretical Model Construction

Through the research and analysis of a large number of literatures, this paper puts forward that the resources of port company can be divided into the following 2 main classes from the perspective of resource-based theory: port company resources and port company capability. Of which, port company resources can be divided into 2 classes including tangible resources and intangible resources, and port company capability can be divided into logistics capability and innovation capability. The international competitiveness of port company can be represented by market performance and financial performance. On this basis, by referring to relevant literature, 14 relational hypotheses and 37 specific observation variables are proposed respectively for port company's tangible resources, intangible resources, logistics capability, innovation capability, market performance and financial performance. Therefore, the basic theoretical framework of international competitiveness of port company is constructed, but data collection is still needed for further empirical test.
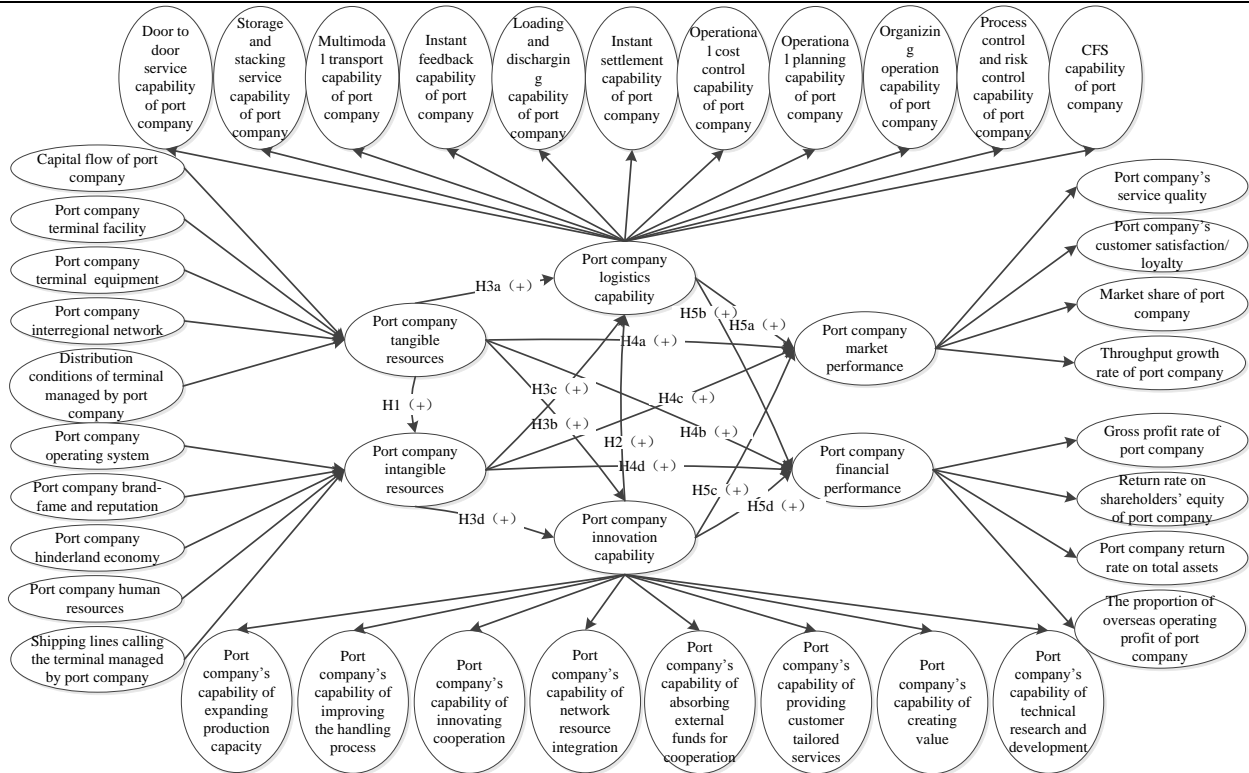
Figure 1. The theoretical model structure chart of the formation mechanism of port company's international competitiveness (37 observation variables)

3. Data Collection

3.1. Questionnaire survey

Before launching the formal questionnaire survey, this study firstly carries out a pilot survey on the designed questionnaire to test questionnaire wording, structure and the reliability and effectiveness of survey process (Sari, etc. (2015), Wamba (2017)). Based on the basic procedure of questionnaire preparation on the scale put forward by Dan Xin (2015), this paper will initially design a questionnaire, which will be distributed through the network of the questionnaire survey consultant -- Questionnaire Research Studio to carry out sampling and filling, and at the same time be submitted to two experts for suggestions.

After one week, 100 questionnaires have been successfully collected and well filled. indicates that the answers set in the questionnaire are answerable and effective both in content and in structure. With regard to the basic information of the respondents of the 100 questionnaires, 68% of the 100 respondents are with the educational background of are high school degree or even below, 37% of them get their working experience less than 5 years, 89% of them are positioned as basic level employees and junior managers in their company respectively. The results show that the respondents are comparatively

inexperienced in working and education and their corporate positions are generally low, which may narrow or limit their understandings of the surveyed items listed in the questionnaire which may lead to the survey results insufficiently reflect the reality. In addition, as for the survey data collected through this method, it is difficult to ascertain that the respondents have accurately focused on a certain port company throughout the filling of the questionnaire. Meanwhile, according to expert feedback, on the basis of the established theoretical model, as for research data on port company, collecting objective data is a priority choice to be selected as a basic data source for empirical research on model observation variables.

Given that the research object is port company, and there are many port companies at home and abroad, in order to improve the reliability of empirical research, and increase the amount of objective data applied to the research, this paper decided to choose listed port companies as the survey objects, for listed port companies are well known to the public with relatively high transparency and by this way to ensure the specific survey targets.

With the consideration of experts' opinions, this paper analyzes different data sources or collecting channels. Generally, there are two types of data in the way of collecting channels for obtaining the evaluation data of observation variables, namely objective data and subjective data. The objective data are mostly collected from public

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International Journal of Intelligent Information and Management Science
ISSN: 2307-0692, Volume 8, Issue 4, August, 2019

media or publications, while the subjective data are mostly collected by survey with questionnaires. The data obtained from objective channels are characterized by standard, accuracy, reasonableness and easy unification. The data obtained through subjective channels can be compatible with complexity, and many evaluation systems in the world, such as Nobel Prize, Michelin three-star restaurant, etc. are mostly completed through subjective channels. Collis (2003) and Yin (2003) proposed that using multi-channel data sources in research, especially in theoretical model research, is a common way, and this can improve the credibility and reliability of research results.

On the basis of the above analysis, in order to collect the research data as clear and reliable as possible to display the real situation of port companies, in this paper, the sample data needed for the research are collected through two channels and combined together into one pool: one is questionnaire survey method, the other is, collecting from listed companies' annual reports and some other publications.

Channel 1, questionnaire survey method mainly aims at the observation variables of port company resources, port company capability and some market performance ob-

servation variables of port company, with a total of 31 items. Questionnaires are distributed widely, and each person in the sample population gives specific evaluation data on 20 listed port companies; Channel 2, mainly aims for the financial performance observation variables and part of the market performance observation variables of the port company, 6 items in total. By extracting data from the annual report of the listed companies with unified processing.

3.2. Questionnaire feedback

After about 3 weeks, a total of 498 questionnaires filled by logistics practitioners are collected by the paid service from "the Questionnaire Star" platform, of which 287 questionnaires are classified as invalid due to too short filling time and too much deviation from the actual situation. Finally, there are 211 valid questionnaires. So the effective rate of this questionnaire survey is 42.37%.

For the 31 observation variables in the theoretical model, the 211 valid answers are obtained through the questionnaires. The basic background information of the respondents is as follows:

Table 1. Background information analysis table of "Questionnaire Star" sample service questionnaire

Survey items	Classification	Proportion
Working years	①Less than 5 years	8.53%
	②6-15 years	74.88%
	③16-30 years	14.22%
	④31-40 years	2.37%
	⑤More than 41years	0%
Gender	①Male	66.35%
	②Female	33.65%
Education	①Junior high school and below	0.95%
	②High School, technical secondary school and higher vocational education	4.27%
	③College degree and undergraduate	85.31%
	④Master degree	9.48%
	⑤Doctor degree	0%
Profession	Freelancer	0%
	②Enterprise in-service staff	97.63%
	③Government staff	1.42%
	④University researcher	0.95%
	⑤Other staffs	0%
Enterprises' attributes of in-service staff	① Shipping vessel company	13.59%
	②Freight and shipping agent	13.11%
	③Logistics company /motorcade	53.88%
	④Port terminal company	9.71%
	⑤Foreign trade companies	4.85%
	⑥Other types of companies	4.85%
Staffing level of in-service staff	①Senior manager	6.31%
	②Middle manager	38.83%
	③Junior managers	35.92%
	④Clerk	18.93%

First of all, the questionnaire samples obtained through the "Questionnaire Star" sample service are all logistics practitioners selected by the "Questionnaire Star". Compared with other practitioners, they basically have a better understanding of the actual situation of port companies in the logistics industry chain. Secondly, compared with the sample population obtained in the preparatory research stage before this empirical study, the sample population obtained through the Questionnaire Star sample service has significantly improved in terms of educa-

tion background, working years and rank positions (the specific improvements are as follows). These people have a more adequate and practical understanding of the management and operation level and status of the listed port companies targeted by the survey, so the results of the questionnaire survey with them are much closer to the real situation, therefore, it contributes positively in helping the realization of questionnaire survey results, and reflecting the reality.

Table 2. Sample quality improvement analysis table in questionnaire survey stage

No.	Analysis index	Statistical indicators of respondents' background information	Preliminary work	"Questionnaire Star" sample service
1	Education background	The proportion of high school education or below in the total sample	68%	4.27%
2	Working year	The ratio of working time less than 5 years in total sample	37%	8.53%
3	Rank	The proportion of general staff in the total sample	67%	18.93%

3.3. The annual report data

According to the theoretical model formed as aforesaid in this paper, as for some observation variables of the market performance and financial performance (a total of 6 items), this paper extracts basic data from the annual reports of the port companies listed in either Shanghai, Shenzhen or Hong Kong. According to the research and measurement requirements, the throughput growth rate, market share of business volume, gross profit rate, return rate on shareholder's equity, return rate on total assets, the proportion of overseas operating profit of these listed port companies in 2018 are measured. Thus the specific evaluation values of 6 measurement variables are obtained.

4. Variable Definition

4.1. The main latent variable

According to the theoretical model proposed at the beginning of this paper, the main latent variables of this paper include port company tangible resources (PCTR), port company intangible resources (PCIR), port company logistics capability (PCLC), port company innovation capability (PCIC), port company market performance (PCMP), port company financial performance (PCFP), of which, PCTR and PCIR are exogenous latent variables, and PCLC, PCIC, PCMP and PCFP are endogenous latent variable, and meanwhile PCIR, PCLC and PCIC are also a mediation variable in the model.

4.2. The main observation variable

There are 37 observation variables in total in this model. The observation variables of PCTR are as follows: capital flow of port company (x_{TR1}), port company terminal facility (x_{TR2}), port company terminal equipment (x_{TR3}),

port company interregional network (x_{TR4}), distribution conditions of terminal managed by port company (x_{TR5});

The observation variables of PCIR are as follows: port company operating system (x_{IR1}), port company brand-fame and reputation (x_{IR2}), port company hinterland economy (x_{IR3}), port company human resources (x_{IR4}), shipping lines calling the terminal managed by of port company (x_{IR5});

The observation variables of PCLC are as follows: door to door service capability of port company (x_{LC1}), storage and stacking service capability of port company (x_{LC2}), multimodal transport capability of port company (x_{LC3}), instant feedback capability of port company (x_{LC4}), loading and discharging capability of port company (x_{LC5}), instant settlement capability of port company (x_{LC6}), operational cost control capability of port company (x_{LC7}), operational planning capability of port company (x_{LC8}), organizing operation capability of port company (x_{LC9}), process control and risk control capability of port company (x_{LC10}), CFS capability of port company (x_{LC11});

The observation variables of PCIC are as follows: port company's capability of expanding production capacity (x_{IC1}), port company's capability of improving the handling process (x_{IC2}), port company's capability of innovating cooperation (x_{IC3}), port company's capability of network resource integration (x_{IC4}), port company's capability of absorbing external funds for cooperation (x_{IC5}), port company's capability of providing customer tailored services (x_{IC6}), port company's capability of

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International Journal of Intelligent Information and Management Science
ISSN: 2307-0692, Volume 8, Issue 4, August, 2019

creating value (x_{IC7}), port company's technical research and development (x_{IC8});

The observation variables of PCMP are as follows: port company's service quality (x_{MP1}), port company's customer satisfaction/ loyalty (x_{MP2}), market share of port company (x_{MP3}), throughput growth rate of port company (x_{MP4});

The observation variables of PCFP are as follows: gross profit rate of port company (x_{FP1}), return rate on shareholders' equity of port company (x_{FP2}), port company

return rate on total assets (x_{FP3}), the proportion of overseas operating profit of port company (x_{FP4}).

5. Descriptive Statistical Analysis

Sample data of 31 observation variables obtained through questionnaire survey and the sample data of 6 observation variables obtained through statistics of annual reports of listed port companies are merged, forming the basic database for the empirical research thereafter. The descriptive statistical analysis results of all observation variables (37 items in total) in the theoretical model of this paper are shown in the following table.

Table 3. Descriptive statistical analysis table of 37 observation variables

Variable name	Mean	Standard deviation	Minimum	Median	Maximum	Variable name	Mean	Standard deviation	Minimum	Median	Maximum
Observation variables through questionnaire survey(31 items)											
XTR1	5.11	1.21	1	5	7	XLC7	5.10	1.28	1	5	7
XTR2	5.13	1.21	1	5	7	XLC8	5.04	1.23	1	5	7
XTR3	5.14	1.24	1	5	7	XLC9	5.12	1.26	1	5	7
XTR4	5.17	1.30	1	5	7	XLC10	5.12	1.26	1	5	7
XTR5	5.10	1.26	1	5	7	XLC11	5.09	1.23	1	5	7
XIR1	5.17	1.24	1	5	7	XIC1	5.05	1.28	1	5	7
XIR2	5.09	1.25	1	5	7	XIC2	5.07	1.24	1	5	7
XIR3	5.14	1.24	1	5	7	XIC3	5.05	1.26	1	5	7
XIR4	5.15	1.23	1	5	7	XIC4	5.05	1.29	1	5	7
XIR5	5.14	1.26	1	5	7	XIC5	5.08	1.28	1	5	7
XLC1	5.14	1.27	1	5	7	XIC6	5.08	1.25	1	5	7
XLC2	5.19	1.25	1	5	7	XIC7	5.04	1.26	1	5	7
XLC3	5.10	1.25	1	5	7	XIC8	5.02	1.27	1	5	7
XLC4	5.13	1.27	1	5	7	XMP1	5.09	1.24	1	5	7
XLC5	5.18	1.25	1	5	7	XMP2	5.14	1.27	1	5	7
XLC6	5.12	1.26	1	5	7	-					
Observation variables through Annual reports(6 items)											
XMP3	0.11	0.21	0.12	0.05	0.96	XFP2	0.06	0.03	0.00	0.06	0.14
XMP4	0.03	0.04	0.00	0.01	0.15	XFP3	0.04	0.02	0.00	0.03	0.08
XFP1	0.28	0.13	0.04	0.27	0.56	XFP4	0.04	0.11	0.00	0.00	0.39

As to the 6 observation variables of objective data collecting mainly from annual reports, the median of market share of port company market performance is 0.01, which is very close to the minimum value 0, but very far from the maximum value. It indicates that the business scale of most listed port companies is relatively small in the global market, and only a few listed port companies occupy a certain scale of market share in the global port market. Both the minimum and the median values of the proportion of overseas operating profit of port company financial performance are 0, but the maximum value reaches 0.39, which indicates that very few listed port companies have a considerable scale of overseas business with a certain operating profit, and the remaining listed port companies have little foreign operating profit. The mean, median and extremum of the other four observation variables are all within a reasonable range.

6. Conclusions and Outlook

As for the formation mechanism of port company's international competitiveness , based on the theoretical model proposed after theoretical research, in order to improve the quality of research data and make the follow-up empirical research results close to the actual situation, this paper carried out a carefully organized questionnaire survey and with preliminary investigation work, the target companies of the model survey are determined as port companies listed in either Shanghai, Hong Kong or Shenzhen, and the data sources of 37 observation variables in the model are also clarified. Among them, 31 observation variables are collected data from respondents with specified professional background by professional research intermediaries, and 6 measurement variables are extracted from the annual report of these listed port companies. Finally, the research data collection and arrangement of the formation mechanism model of port company's international competitiveness of are achieved and fulfilled.

As for 29 observation variables in the theoretical model including 5 observation variables of port company tangible resources, 5 observation variables of port company intangible resources, 11 observation variables of port company logistics capability, 8 observation variables of port company innovation capability and the first two observation variables of port company market performance, are obtained the sample data through questionnaire survey, it is necessary to conduct further test and analysis with regard to reliability and validity before conducting a empirical research. Referring to the analysis arrangement on research source data in the dissertatoins Huang Jingjing (2018), Zhang Zenglei (2018), Gao Shuai (2016), 6 measurement variables obtained by collecting objective data in the theoretical model can be directly applied to the empirical research thereafter.

References

[1] Dan Xin. The basic procedure of statistics compiling scale. New West(theory). 2015, (06), 144+132.

[2] Gao Shuai. Research on governance structure, diversification and corporate performance of Chinese real estate listed companies. Tsinghua University. 2016, 103-108.

[3] Huang Jingjing. Research on technology diffusion path based on collaborative innovation model. Dalian University of Technology. 2018, 122-126

[4] Zhang Zenglei. Research on the economic effect and action path of the government investment fund. China Academy of Fiscal Sciences. 2018, 153-155

[5] Collis D.J., Hussey R. Business research: A practical guide for undergraduate and postgraduate students. 2003, 2nd ed.

[6] Sari, Shaharoun, Ma'aram, Yazid. Sustainable maintenance performance measure: a pilot survey in malaysian automotive companies. Procedia CIRP. 2015, 26, 443-338

[7] Samuel Fosso Wamba, Angappa Gunasekaran, Shahriar Akter, Steven Ji-fan Ren, Rameshwar Dubey, Stephen Childe. Big data analytics and firm performance: Effects of dynamic capabilities. Journal of Business Research. 2017, (70), 356-365

[8] R.K.Yin, Case study research: design and methods. Sage Publications. 2003.