The Accounting Method in the Service Industry of China

— The Estimation of Value Added by a Cultural Industry Model

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ABSTRACT

The accounting of service industry of China is getting behind compared to the account of industry; especially the statistical system and accounting method of modern service industry such as cultural industry have some faultiness. So our paper takes the cultural industry for example to discuss the feasibility of estimation and inspection of important value index such as value added by volume index with relatively better quality in practice statistical data. We establish our value added model base on data of cities around the country of China and corporations of Beijing to proof our thought.

Keywords: Culture Industry; Value Added; SEM; Value Index; Volume Index; Practicality

It is known to all that the culture of China is of long standing, and various culture activities not only establish the basic faith of the Chinese society development but also immit driving energy to it. As a result, to get a clear understanding of the power of culture and its status in the national economy is of great importance.

1 Introduction of Culture Industry

Culture industry is a term coined by Theodor Adorno (1903-1969) and Max Horkheimer (1895-1973), who argued that popular culture is akin to a factory producing standardized cultural goods to manipulate the masses into passivity; the easy pleasures available through consumption of popular culture make people docile and content, no matter how difficult their economic circumstances[1]. This is just a concept interpreted in the angle of it function. Another interpretation from the UNESCO[2]states that ***Culture industry*** *applies to those industries that combine the creation, production and commercialization of contents which are intangible and cultural in nature. These contents are typically protected by copyright and they can take the form of goods or services. They include publishing, music, audiovisual technology, electronics, video games and the Internet.* Actually the concept and connotation of culture industry differs among countries, which leads to a lack of comparison between them. As we are going to discuss the Chinese situation, we will stick to the definition published by Chinese government. But the concept unification leaves a

[1]From Wikipedia, the free encyclopedia
[2]United Nations Educational, Scientific and Cultural Organization

great challenge which needs a great effort of all countries.

In China, the concept of **Culture industry** is first mentioned in a formal document of the government in 2000. And later in 2004, the NBS published *the classification of cultural and corrective industry*, a milestone of the cultural statistics. It gives the circumscription of culture industry in six aspects as follows.

1 the produce and sale of cultural product
2 the cultural transmit service
3 cultural entertainment service
4 the produce and sale of cultural article for use
5 the produce and sale of cultural equipment
6 the produce and sale of correlative cultural product

Ideally, our research must strictly comply with this circumscription, but data source is not as good as we want. Therefore, we resorted mainly to the China Statistical Yearbook, China Statistical Yearbook on Cities, and China Statistical Yearbook on Culture and Relics, which includes data of the culture industry as a subset.

According to this three yearbooks, our culture industry is divided into seven main sections, which is

1 art industry
2 libraries
3 cultural service
4 cultural market management
5 cultural education institution
6 cultural research institution
7 cultural relic industry

And in our research below we also use data from the 2004 economy general survey of China to build the corporation model.

2 Basic Thread of the Value Added Model of Cultural Industry

The national economic accounting is mainly base on the value index, so for a long time, the information source of national economic accounting is confined to corporation accounting, which is not a optimal choice of the developing country. Since the accounting data of corporations suffer from the low quality problem, the direct use of them to national economic accounting will lead to indeterminacy of the result. And, by contrast, the practicality data of a corporation or institution is their daily record of business, which are easier to get and relatively objective and superior in quality. According to the reality of China, the attempt of national economic accounting important index such as value added, national income and profit by the information extracted from volume index and estimating by effective statistical model is worth discussion.

Why volume index is chosen?

As the development of accounting Method in the Service Industry of China is relatively slow nowadays, it is far off the request of SNA. In present statistic system, two kinds of data concerning about the enterprises are available. One is the product accounting index data and asset and debt data in the SNA collected by the report forms system, and finance data from finance report forms. This kind of data is accounted in the sight of value, and can be called as value index. Another kind of data is the account of material objects about the situation and activity of the enterprises, which can be called as volume index. The thought of volume index derive from the two reasons below.

(1) Value data is directly from accounting data, suffering general quality problem.

The data collection of enterprises is the beginning of statistic work, the foundation of economic situation analysis and the evidence of policy constitution of macro-control. As a result, the quality of the enterprises data is of great significance. But, due to the lack of responsibility confine and social supervisal of the active statistical report forms system, the problem of “two account books” or even “many account books” may exist in the accounting of corporations, directly affect the quality of the accounting data. According to the situation of the report forms of some grass-roots corporations, some macro indexes are unnecessary for their own business, hence, it is difficult for them to understand them clearly. And the difference of accounting system and statistic system makes the accountant, always the same person who fills the statistical forms, submits some statistical data falling short of statistical system. This is not the case of only China, but many developing countries suffer the bad quality of basic value accounting data. Even certain statistical clerks are sent to each corporation for data, there is no access to the real balance data. This is the most important reason why we recommend practicality data but being cautious of value data.

(2) The value data are sensitive and easily affected by people.

In reality, the quality of the enterprises data is dissatisfying us. It is mainly because the value index, dealing with the price factors easily affected by people. Financial data are sensitive data. For example, data like business profit suffer a low quality of data due to avoiding tax. And this problem is prominent in the accounting method in the service industry of China. When it comes to the existing statistic base of cultural industry, if we try to account it according to the rules in SNA, it is hard to make implement. Comparatively, the objectivity of volume data like the number of employees, output of product, sells quantity, times of activity and so on is more objective for they have less links with financial forms and tax.

For the two reasons above and our daring question of the accounting method only with value index, we hope to test and modify the value index by checking volume index, and make estimations and predictions on the value added of cultural industry. Theoretically, it is doable. Actually, since value index reflect the business performance of an enterprise and measure the worth created by it, it is fair to consider value index as measurement of the result of production. And volume index is an objective description of the procedure of production, so we can consider it a reflection of original side of the procedure of production. Therefore we can make use of the

chain in value production and make a reproduction of the procedure of gaining profit and creating value by the description of volume index in order to attain value index reflecting the result of production. That is to say, by review the objective relationship of data and follow the rules of object combination, we can get certain data we need for analysis.

First we will begin with data of 286 cities in 2004, which are easier to collect and relatively correct. The city data, although not so micro as corporation data, are not so aggregative compared to the province data or country data. They can be considered as data of some big enterprises. Secondly, we also collect data of 35651 corporations from the 2004 economy general survey of China to build the corporation model. It is also availability and representatives that help the choice, as Beijing is the most developed cultural city with big scale and various cultural institutions.

Our research thread of the article can be described by CHART1 below. The analysis of city data and corporation data is our beginning point. We hope to find the potential objective relationship of value data and practicality data, and reset them according to the statistical purpose to get high quality data we need. Following the thread, we want to reach our purposes below.

1) To verify value data by practicality data.

2) To describe the system relation form the specific cultural production to the form of business value of the cultural corporations

3) To revise the value data by practicality data in order to get relatively correct estimator of important index such as value added.

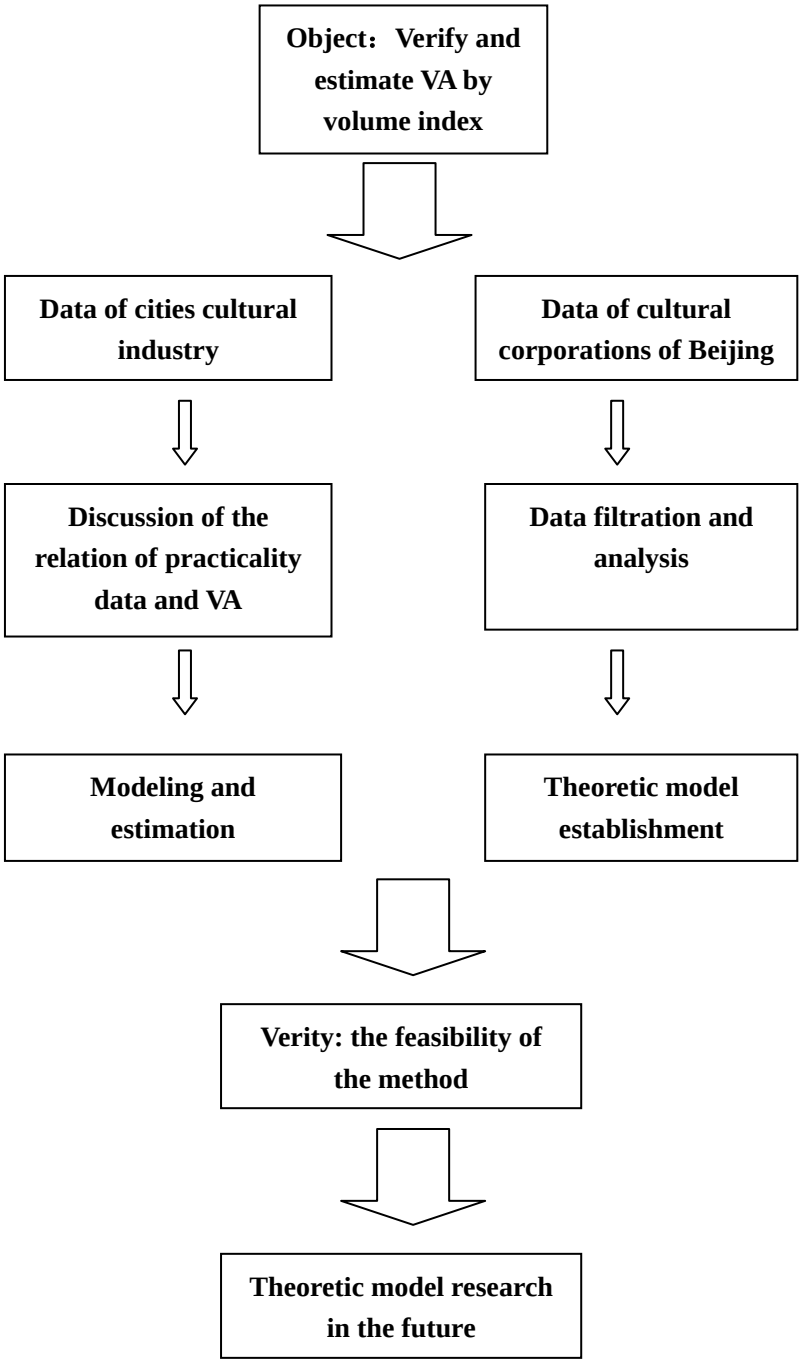

Chart 1　the Research Frame

3　The Value Added Estimation Base on City Data

Which indexes are chosen?

As we know that 2004 is the year of the implement of a new cultural relic statistical report form system, the data in this aspect is relatively good and representative to the whole culture

industry. Now we have a browse of the cultural relic data.

(1) Institution

According to the data of 2004, there are 3965 cultural relic institutions around the whole country, among it there is 1548 museums. The provinces which have more museums are Guangdong, Hubei, Jiangsu, Shanxi and Jiangxi. Xizang and Ningxia have the least museums.

When it comes to the amount of the institutions, Shanxi(303), Henan(225), Sichuan(218), Hebei(215), Guangdong(207), Shanxi(200),Hunan(200) all these province have more in amount. On the opposite, provinces such as Xizang(15), Ningxia(29), Hainan(25),Qinghai(41) have less institutions, all in the western part of China.

We can dig from the figures above that the number of institutions is directly relative to the economic performance and the inside cultural environment of the province. And, these institutions are place where value added is produced. Hence, it is feasible to consider the number of institutions of all kind as a volume index to estimate the value added.

(2) Employee

Then let's have a look at the data of the employee. There are totally 77101 employees in the cultural relic industry, among them there are 28128 people belong to the relic protection institutions and 39266 people belong to the museums, which take up 87% of the whole relic industry. Form the aspect of the title of technical post, 3971 employee have the high title of technical post.

People is the conductor of the production, hence, the amount and the quality of employee make a great effect on the value added. Culture industry is in this case. Although its request of people amount is not as eager as the labor intensive industry such as Manufacturing, the request of basic quality of them is one feature of culture industry. Therefore, the manpower input is considered in our model below.

(3) Practicality

We have discussed the place and power to produce cultural industry. Then it time to talk about activities and materials. There are 23,879,724 cultural relics in 2004.The provinces which have the most and least relic are list below.

Table 1 Relic's Numbers in Some Provinces

Rank	Province	Relic's Number	Rank	Province	Relic's Number
1	Beijing	3704250	6	Hunan	1108324
2	Jiangsu	1881915	7	Guangdong	1171267
3	Henan	1449024	29	Ningxia	77677
4	Shanghai	1448863	30	Guizhou	52101
5	Hubei	1288794	31	Hainan	30491

The cultural relic industry held 6918 exhibitions in 2004,among it Guangdong(668), Zhejiang(567), Jiangsu(558), Anhui(547), Shandong(462)and Sichuan(396)provinces held most of the exhibitions； Xizang(7), Hainan(24), Ningxia(33) provinces held the least.

The cultural relic industry receive 145273 thousand spectators. The provinces which accept more spectators are Zhejiang(17156 thousand), Sichuan(12026 thousand), Guangdong(1079

thousand), Shanxi(10074 thousand), Henan(9286 thousand), Hebei(7065 thousand)； and the least spectators provinces are Qinghai(310 thousand), Hainan(324 thousand), Jilin(700 thousand)。

The data list above tell us that, as a cultural relic institution, its materials for production are these actual things such as cultural relics, books, magazines, videos, cds, and its produce activities are conducting exhibition, books sales and so on. We can learn from the data that the number of visitors, relics and shows is directly relative to the economy development of the province. As a result, we will mainly consider this kind of volume index in our model.

The Estimation of Value Added

By using the structural equation model in modern statistic, we can let the value added of cultural industry, which reflects the scale and development of cultural industry, as latent variable and design a structural equation model base on the volume index of cultural industry activity, some important value index and the industry chain. We are going to use data from year books of cities in China to realize our research.

Considering the availability of data, we can start with seeking data in the year books of cities, and figure out the connection between volume index and value added by choosing some important index both in value and volume and building structural equation models.

The value added of cultural industry is the most important index reflecting the output, and can be use to measure the result of devotion. When it comes to the aspect of devotion, we know that the devotion of labor force, capital and technique will determine the output base on the product function theory. Considering the actuality that the development of cultural industry is on its initial stage, and it needs the policy and financial support, we can use "**manpower input**", "**capital input**", "**practicality input**" as three measurable variables to estimate "**devotion**", which is relatively abstract and latent. The design of the apparent variables is below:

Manpower Input: the number of employee and the total amount of their wage.
Capital Input: the government appropriate fouds and expend of citizen on cultural product
Practicality Input: the amount of cultural relic, library books, art perform teams, art perform places, theaters, showplaces, libraries, cultural places, relic protection institutions, museums, recreation grounds, game halls and internet bars.

The corresponding index can be consult in the year books of cultural industry. Base on the data we collected, we consider to build two models as follows.

(1) Confirmatory Factor Analysis

In order to build a SEM to estimate the value added, we combine the factors mentioned above and collect data of 286 cities in China in the year 2004, which are list below.

Table 2 The Input and Output Indexes of Culture Industry

Practicality Input	Cultural Relics	Library Books	Art Perform Teams	Art Perform Places
	Theaters	Libraries	Cultural Places	Relic Protection Institutions
	Museums	Recreation Grounds	Game Halls	Internet Bars
Manpower Input	The Number of Employee	The Total Wage of Culture Industry		
Capital Input	The Expand of Citizen on Cultural Product	The Government Appropriate Fouds		
Practicality Output	Books Impression	Magazines Impression	Newspaper Impression	Number of Exhibition
	Museum Visitors	Books Circulate Person-Time	Reader Activities Participators	Books and Periodicals Lend Times
Value Output	Cultural Institution Takings			

Base on the indexes above, we built the Confirmatory Factor Analysis model as chart 2 and chart 3, the relationship between input, output and value added is what we care most.

First take a look at the relationship between the input of all aspects and the value added of culture industry.

The estimate result of relationship between their factors loading is below.

Result 1

	Estimate	P
Manpower input <--> value added of culture industry	0.820	0.000
Manpower input <--> practicality input	0.808	0.000
Manpower input <--> capital input	0.784	0.000
Practicality input <--> value added of culture industry	0.808	0.000
Practicality input <--> capital input	0.735	0.000
Capital input <--> value added of culture industry	0.785	0.000

The estimate result tell us that manpower input, practicality input and capital input all have strong positive correlation with the value added. All the three can be considered as the force of value added to push it forward. And the correlation between them is also strong enough to explain each other. From the aspect of culture industry, manpower input, practicality input play more important roles than capital input.

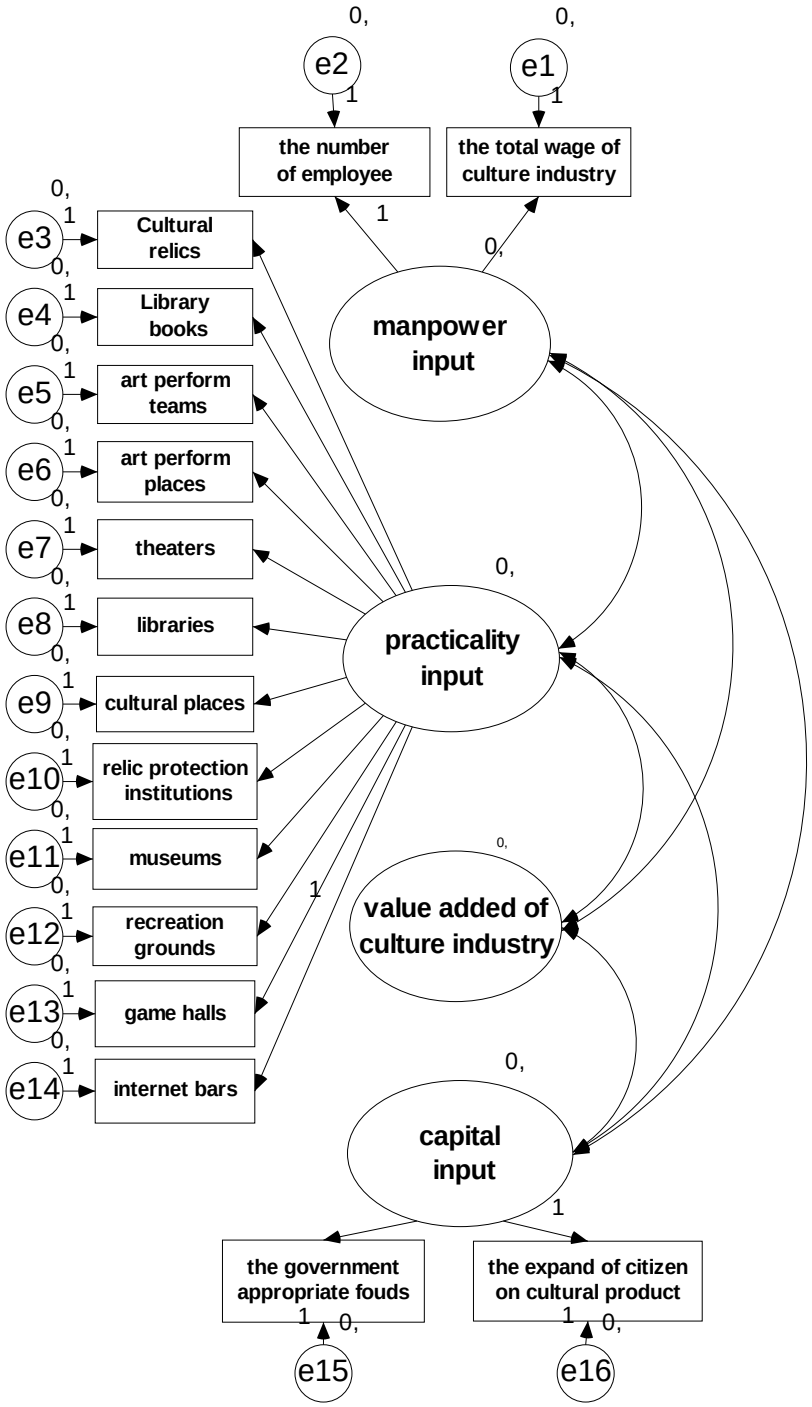

Chart 2 Model 1-The Confirmatory Factor Analysis Model of Input And Value Added

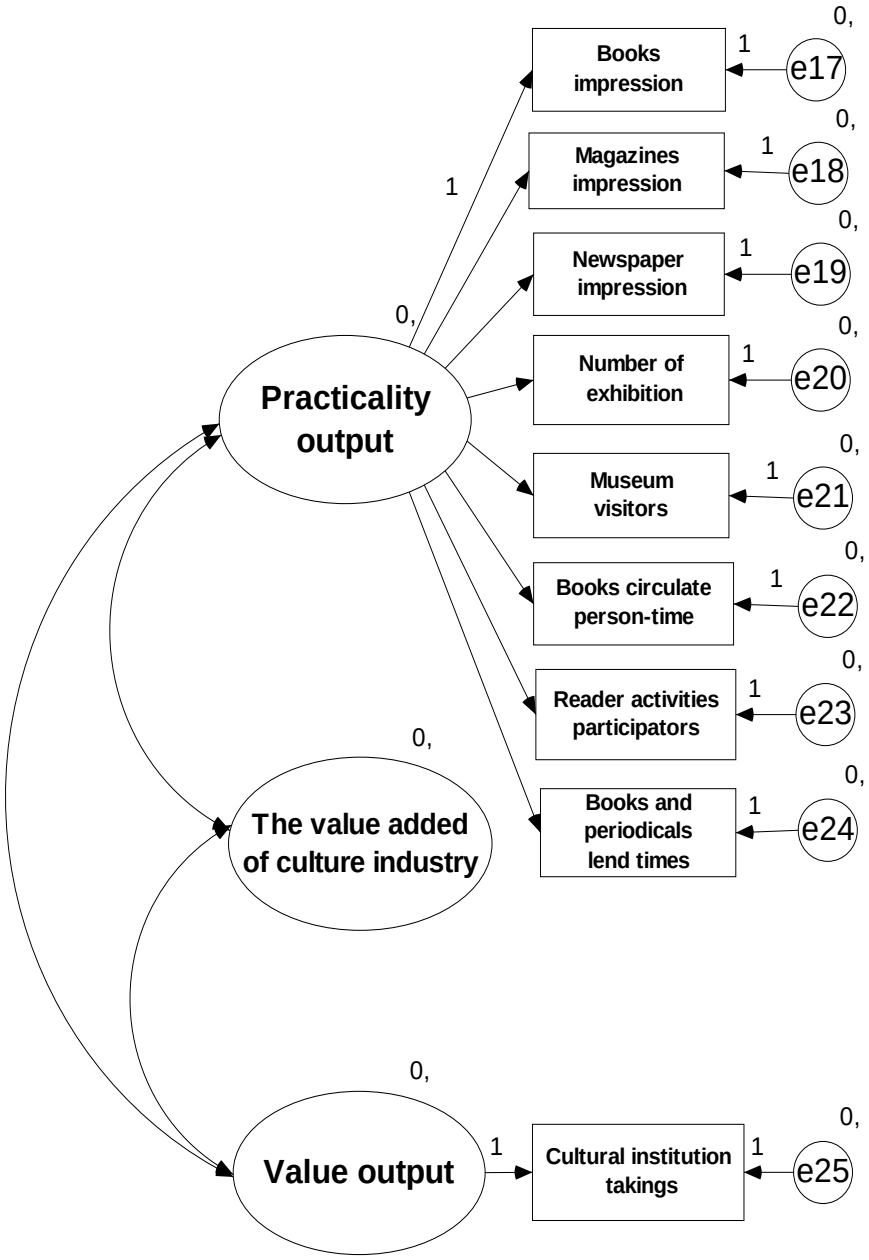

Chart 3 Model 2-The Confirmatory Factor Analysis Model of Output And Value Added

The estimate result of relationship between their factors loading is below.

Result 2

	Estimate	P
Practicality output <--> value added of culture industry	0.861	0.000
Value output <--> value added of culture industry	0.902	0.000
Practicality output <--> Value output	0.799	0.000

The estimate result shows that the relationship between output and value added is stronger than input. That is because value output can be said as the source of value added, and the distance between Practicality output and value output is just the price factor.

Therefore the factors and indexes are all validated to be the estimator of value added.

(2) Seven Aspects SEM

For the complexity of culture industry, the gross index of it is always various from different data source. Instead, the data from its sub industry have higher quality with a clear definition. And data from the same industry are high relative, which is need for the contribution to the same latent variable. Hence, we consider the seven aspects SEM as it is show in chart 4.

The Manifest Variables of each latent variable is list in table 3.

Table 3 Seven Aspects Practicality Indexes

Latent Variable	Manifest Variables				
Art Industry	Art Perform Teams	Art Perform Places	Theaters	Art Team Perform Scenes	Art Place Perform Scenes
Libraries	Books Circulate Person-Time	Reader Activities Participators	Books And Periodicals Lend Times	Books	Libraries
Cultural Service	Cultural Places	Number of Exhibition	Number of Literature Activity	Number of Training Classes	Number of Lectures
Cultural Market Management	Recreation Grounds	Game Halls	Internet Bars	Chain Shop	Media Product Retails
Cultural Education Institution	Recruit Students	Schools	Graduates	Students At School	Train Clerks
Cultural Research Institution	Research Projects	Research Centers	Monographs	Papers	Relic Found
Cultural Relic Industry	Relic Exhibition	Visitors	Relics	Relic Protection Institutions	Museums

The estimate result of relationship between their factors loading is below.

Result 3

	Estimate	P
Value added of culture industry <-- art industry	0.382	0.000
Value added of culture industry <-- libraries	0.090	0.000
Value added of culture industry <-- cultural service	0.019	0.515
Value added of culture industry <-- cultural market management	0.554	0.000
Value added of culture industry <-- cultural education institution	0.090	0.044
Value added of culture industry <-- cultural research institution	-0.117	0.008
Value added of culture industry <-- cultural relic industry	0.009	0.823

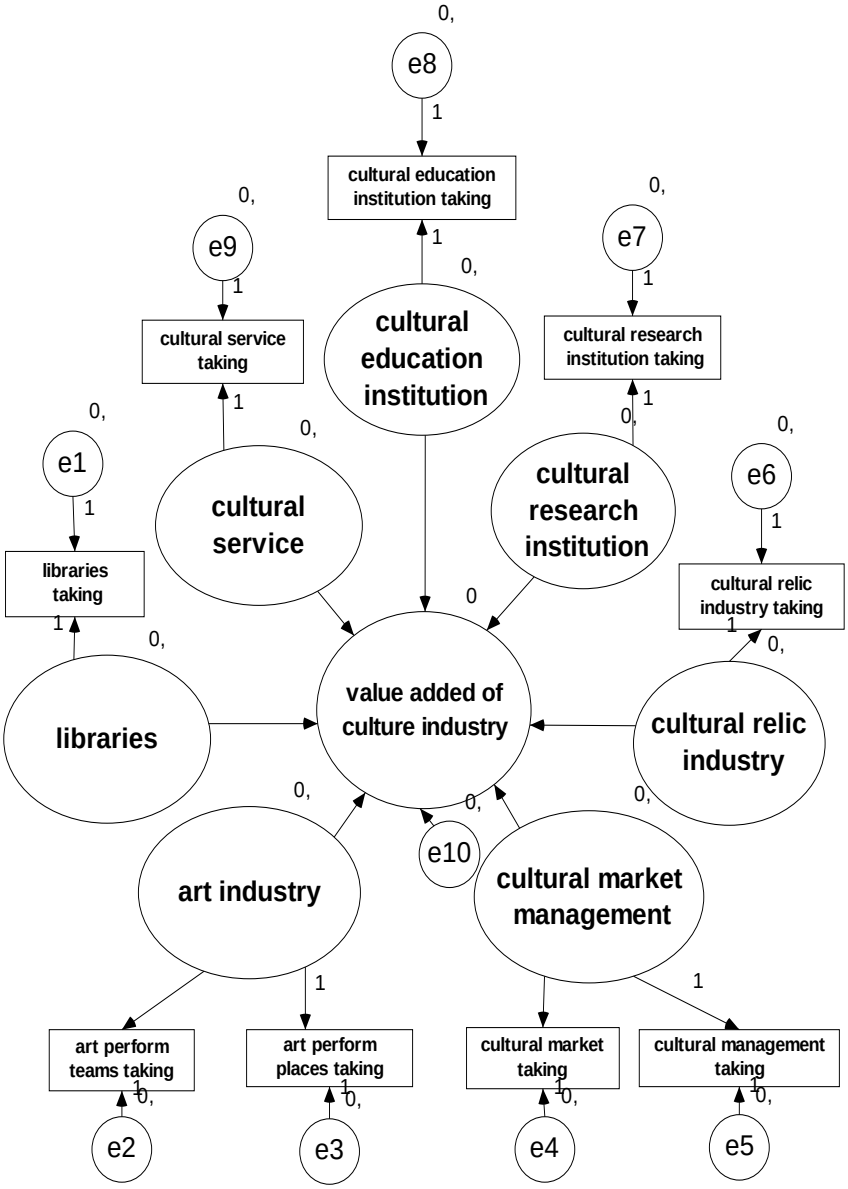

Chart 4 Model 3-Seven Aspects SEM

The estimate result shows that all these sub industry make contribution to the value added of culture industry except cultural research institution which have a little negative effect. In the seven industries, beside manpower input and capital input, the most important factor is the practicality input, which has been proved above. The relationship of each sub industry and its practicality is hided behind the contributions and we are going to dig it out.

Appendix 1 tells us the situation of art industry. We can see that the number of art perform teams and art team perform scenes have negative effort on the gross income. On the opposite, theaters, art perform places and art place perform scenes have very strong and positive effort on it. That is to say, it will bring more income by performance at the art places than the outgoing of art team.

Appendix 2 shows us something about libraries. Books circulate person-time and books add a great push on the gross income of the libraries, especially the number of books. It means that the value added of the libraries depends on the scale factor to a great extent.

Appendix 3 is the result of cultural service. As we know, the gross income mainly depends on number of exhibitions. The task of cultural service places is putting on all kinds of exhibitions and they earn profit by selling tickets. As a result the numbers of exhibition determine the income of this industry directly.

Cultural market management is the closest industry to market economy among the seven sub industry. It earns profit by selling cultural product and providing cultural services. Due to the access limit to data, we only collect data of the five indexes: recreation grounds, game halls, internet bars, Chain shop and Media product retails. Appendix 4 reveals that only recreation grounds and game halls pass the significance test. As long as I am concerned, singing and dancing recreation grounds is the best choice for young people to release their pressure and have a relax, so its amount positively promote the increase of income. However, with the development of computer and internet, play video games at home is common, and the game halls' business is just like the setting sun, and even block the development of cultural market management industry.

Let's move on to the analysis of cultural education institutions. Appendix 5 tells us that recruit students is the most important determinant factor, and other index can not pass the significant test. That is easy to understand, for the new recruit students bring the schools a great amount of tuition.

Appendix 6 shows us that cultural research institution only depends on the research project amount, which is their main product.

When it comes to the cultural relic industry, Appendix 7 tells us that it depends on relics, relic protection institutions and visitors. It is easy to understand as the production procedure, more factories, more materials, and more times to use definitely leads to more profits.

According to the analysis, the seven sub industries have all find their corresponding practicality factors. Finally we use the regression equation and the seven aspects SEM，with the practicality data of the whole country to estimate the value added of culture industry, and get the result of 186.24 billion yuan, a little less than the report data—195.8 billion yuan, with a estimate error of about 5%.

By the way, by carefully analyze the relationship of income and practicality data, we find some suggestion for some of the industries. Art industry should take advantage of the places; libraries and cultural relic industry should enhance the quality and quantity collect books and relics and promote scale construction. The cultural education and research institution just stick on its job is okay for their development. And the cultural market management should learn the market demand as a guide for their sale.

4 Another Example Base on the Data from Corporations

Now we use the data of cultural activity corporations of Beijing from the economy general survey in 2004 to continue our attempt. The objects of analysis are cultural corporations implementing the accounting system, which take up about 83.5% of all cultural institutions and can be consider as the main producers. Although cultural institutions for commonweal also belong to the concept of cultural industry, we mainly concern about the profit-making corporations for their market profitability chasing characteristics.

(1) The Design of Theoretical Models

At present, the lack of practicality data in the statistical system cannot give us a good description of the activities of cultural industry. Of course it is the result of the primary stage of cultural industry of China and juvenility of the research and index system. Due to the data limitation, our models are relatively simple with less index included, especially volume index, which only include the number of employee and the proportion of high degree employee. As a result, our models below cannot give a direct-viewing interpretation of the procedure from specific activities to business value, but just an attempt to find a good one.

Good models should be simple and well-fitted, complex model with a better fitting effect is not a best choice. Hence, we are going to build a model with simple structure and logical relation base on the theory of product function and IO accounting idea of SNA.

One of the advantages of the SEM model is that you can design many models and choose the best one according to the fitting effect and the real meaning revealed by the path structure. Therefore, we design 4 theoretical models below and plan to choose the best one for estimation.

a) Input- output recursion model

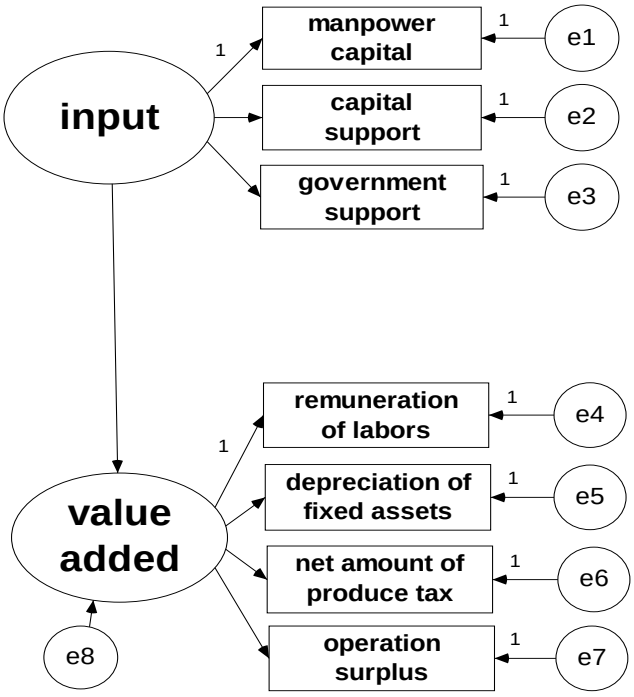

Chart 5 Model 4-Input- Output Recursion Model

Chart 5 shows us the design of the input- output recursion model. We let value added as a endogenous latent variable to represent the output factor, ad set up a exogenous latent variable to describe the input factors. According to the theory of product function and the situation of the cultural industry of China that government policy and financial aids plays an important role, we set up "**manpower capital**", "**capital support**", "**government support**" as three measurable variables to estimate "**devotion**", which is relatively abstract and latent. The design of the apparent variables is below:

Manpower Capital: the number of employee, the number sorted by degree and the title of a technical post
Capital Support: aggregated capital
Government Support: appropriate funds and allowance from the government

According to SNA, we set up 4 variables: remuneration of labors, depreciation of fixed assets, net amount of produce tax, and operation surplus to be the measurable variables of the latent value added. And here they are not the simple additive relation as we known before. We just borrow their name for the income of labor factor, capital factor, government management factor and corporation management factor. Data we get are substituted in as their values. For example, the operation surplus can be defined as profit or income of main business. The most important thing is that they are all seem to be variables with errors, then the quality problem can be eliminated by estimation.

We should emphasize that we can use the data we have got (even if some quality problem exist) to build the structure between value added and acquirable data, and calculate the factor scores of the 4 factors mentioned above by their factor loadings, the mean of which is our estimated value added. Compare it with the published data of general survey, we can check and revise the value added.

b) Input- Output Nonrecursion Model

The so call recursion model means the relations between variables are all one-direction without any reactions and correlation between errors. If this single direction relation can not be satisfied, the model is defined to be nonrecursion.

Chart 6 below shows us the model. The only difference between model 4 and model 5 is that we make the assumption of a correlation between input and value added.

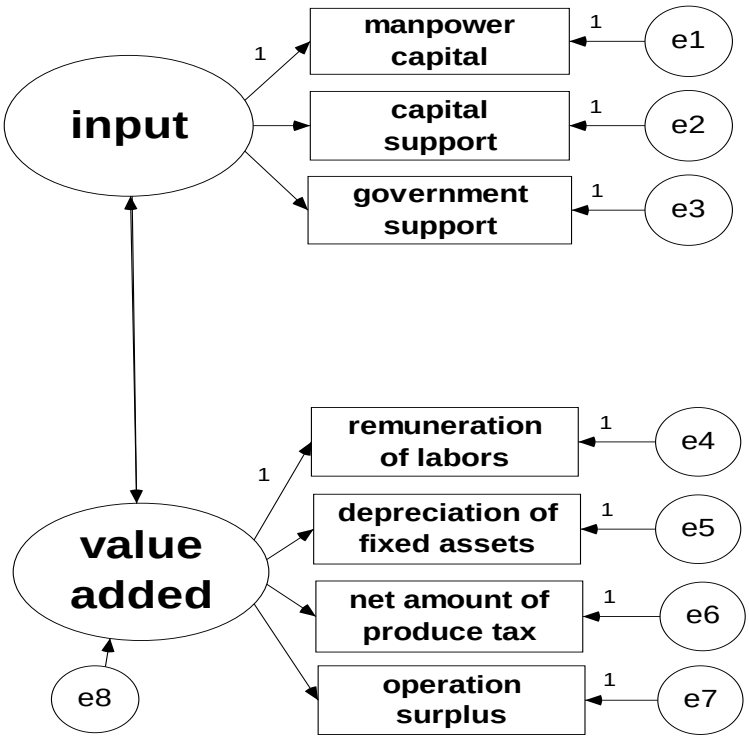

Chart 6 Model 5-Input- Output Nonrecursion Model

c) Confirmatory Factor Analysis Model

Due to the probably existing quality problem of data, we design a high level factor analysis model as chart 7 shows. We set the 4 variables: remuneration of labors, depreciation of fixed assets, net amount of produce tax, and operation surplus as latent variables of the latent variable--value added. It can be interpreted that as the output increased, labors' income, produce tax and operation surplus will be higher, and the equipments will be updated. The productivity is considered to be the basic of the income of residents, corporations and government and the determinant factor of them.

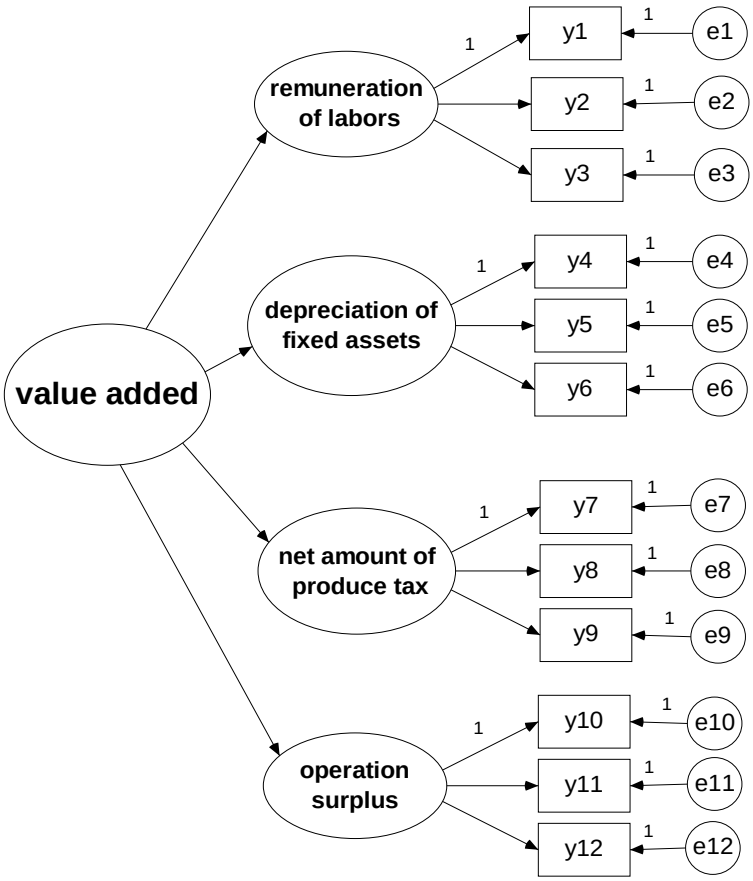

Chart 7 Model 6-Confirmatory Factor Analysis Model

d) Input-Output-Efficiency Model

According to the theory of SNA, ***value added= total output - midway consume***, hence the midway consume reflect the utilization efficiency. Therefore, we introduce the idea of input-output-efficiency, and let value added as the exogenous latent variable, output and efficiency as exogenous latent variables. And the structure between them is that input and efficiency affect output, meanwhile higher efficiency gives corporations more confidence and leads them to increase the input. The structure is showed as chart 8. The efficiency latent variable is designed as:

Productivity Efficiency: profit and tax per capita
Capital Utilization Efficiency: capital contribution ratio, profit and tax rate on funds and assets-liabilities ratio
Profitability: profit rate on principal revenue

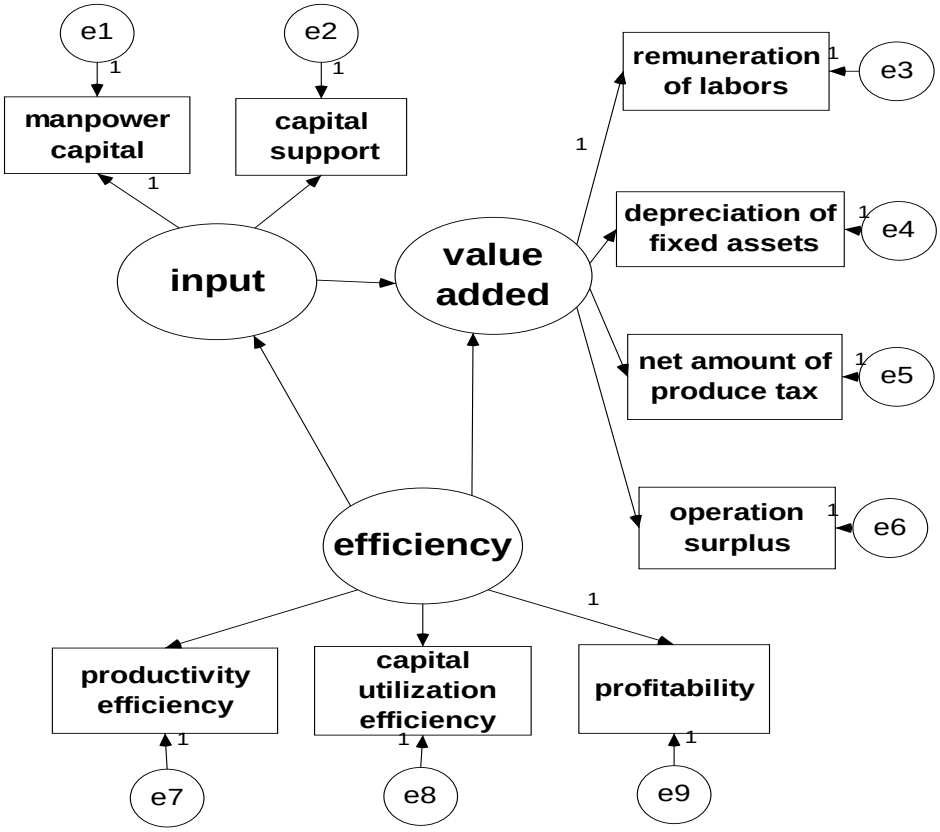

Chart 8 Model 7-Input-Output-Efficiency Model

(2) Data Situation and Pretreatment

Now we are going to make a browse of the 35651 corporations' data.

Table 4 The Data Distribution of Some Important Indexes Of The 35651 Cultural Corporations

Units: Person, Thousand (The Same of The Tables Below)

	Minimum	Maximum	Mean	Standard Error	Coefficient Of Variation	Skewness	Kurtosis
Staff And Workers At The Year-End	0	4788	16.54	67.74	4.10	28.23	1276.93
Current Assets	-16597	5738952	7124.87	85813.43	12.04	35.93	1679.50
Fixed Assets	0	1545177	1886.17	25167.51	13.34	34.55	1540.84
Principal Sales Tax And Extra Charges	-789	128126	91.37	1222.06	13.38	57.99	4673.27
Liquid Liabilities	-17633	5315115	5746.49	78973.06	13.74	37.88	1816.40
Total Liabilities	-17633	6075115	6434.67	88628.91	13.77	37.57	1800.71
Annual Depreciation	-34410	210986	134.22	2175.71	16.21	55.54	4104.27
Compensation For Labors	0	1175663950	446595.84	7626998.00	17.08	116.94	16684.53
Total Assets	-16177	34384919	12436.06	226347.39	18.20	105.37	15112.06
Operating Revenue	0	21328531	7896.62	163148.18	20.66	84.75	9350.91
Principal Sales Revenue	0	20372367	7658.45	158584.05	20.71	83.04	8917.77

Principal Cost Of Sales	-15107	13770471	6014.57	126632.87	21.05	70.87	6153.49
Overhead Expenses	-289	2568306	813.30	17136.08	21.07	119.34	16339.49
Paicl-Up Capital	0	16467064	4588.74	112257.04	24.46	111.67	14826.14
Creditors Equity	-395948	30373265	6001.33	176886.91	29.47	145.08	24446.37
Revenue From Subsidies	-10219	155192	35.16	1083.20	30.81	94.13	12227.19
TAXES	-289	52902	11.34	349.98	30.87	115.54	15954.00
Principal Product Profit	-595686	4645750	833.80	27762.86	33.30	138.34	22381.14
Long-Term Liabilities	-1613	3774877	687.58	25042.35	36.42	108.71	15021.19
Intangible Assets	-72	1741666	316.66	12517.85	39.53	118.31	15254.18
Value-Added Tax	-46069	1092768	120.16	6099.72	50.76	163.14	28931.23
Long –Term Investment	-33	33606645	2953.61	185819.12	62.91	167.35	30033.52
Total Sale Revenue	0	10957073	937.01	63050.95	67.29	153.62	25925.47
Operating Profit	-652940	3051922	187.26	18238.22	97.39	130.42	22090.92

Base on the information from table 4, we can see that there are two characteristics of these data.

a) The distributions of value index, especially sensitive financial index is unstable.

The coefficients of variation reveals that value index have larger difference than volume index such as "*staff and workers at the year-end*". All the value indexes have a absolute coefficient of variation larger than 10.some sensitive financial indexes such as *operating profit* have a high coefficient of variation of 97.39; the coefficient of variation of *total sale revenue* is 67.29 and that of *long–term investment* is 62.91.the unstable distortions may attribute to two reasons: one is the feature of the industry, the other may be the low quality of data.

b) All the index data do not obey the normal distribution.

Almost all the indexes are right-skewed. From this, it can be seen that certain big cultural group and corporations play important roles in the whole cultural industry of Beijing. From the data of the kurtosis we can see that the gaps between corporations are quite large.

Due to the unsteadiness of the data and the scale and level difference of the corporations, we cluster the corporations in order to pick out corporations of the same group with relatively good quality.

Table 5 Number of Cases in Each Cluster

Cluster	1	5.000
	2	1.000
	3	29483.000
Valid		29489.000
Missing		6207.000

Table 6 Final Cluster Centers

	Cluster		
	1	2	3
Operating Revenue	7813111	5201870	8037
Staff And Workers At The Year-End	1396	4788	19
Proportion Of High Degree	1.0	1.0	.6
Annual Depreciation	19714	113950	150
Total Assets	3745774	9025802	11393
Compensation For Labors	287903200	1175663950	437859
Labors Expend	550473.80	984348.00	604.59
Operation Surplus	672010.00	102752.00	220.15
Produce Tax	326161.00	258386.00	162.69
Profit And Tax Per Capita	3911.72	75.43	5.61
Profit Rate On Principal Revenue	.11	.32	-.36
Fixed Assets + Current Assets	2832165.80	4105882.00	9232.38
Profit And Tax Rate On Funds	.26	.09	-.06
Ratio Of Assets To Industrial Output Value	.21	.04	-.04
Assets-Liability Ratio	.60	.31	.53

From the result of cluster showed by table 5 and table 6 we can see that 29489 corporations with good data quality can be divided into 3 groups. The first group has 5 corporations with high productivity efficiency, high output level and high capital utilization efficiency, but also has a high Liability level. The second group is only one corporation with a large scale and more labor and capital input, but lower efficiency than the first group. In short, these 6 corporations can be considers as important corporations with big scale and business. And the rest 29483 cultural corporations are typical ones which can represent the development level of the whole cultural industry.

Table 7 below tells us the distribution of some indexes of the 29483 corporations. Although some indexes still can not obey the normal distribution, the stability of data obviously increases. As a result, our model will base on the standardized data of the 29483 samples.

Table 7 The Data Distribution of Some Important Indexes of the 29483 Cultural Corporations

	Minimum	Maximum	Mean	Standard Error	Coefficient of Variation	Skewness	Kurtosis
Operating Revenue	1	9758355	8037.14	105875.26	13.17	56.33	4089.78
Staff And Workers At The Year-End	1	2685	18.52	64.92	3.51	20.27	614.62
Proportion Of High Degree	0	1	0.57	0.38	0.66	-0.26	-1.44
Annual	-3565	210986	150.31	2242.03	14.92	56.27	4157.70

Depreciation Total Assets	-16177	6698878	11392.93	116111.14	10.19	28.63	1124.48
Compensation For Labors	0	118920521	437858.61	2490397.27	5.69	21.65	678.56
Labors Expend	-38	240476	604.59	4282.81	7.08	29.30	1232.44
Operation Surplus	-652940	420495	220.15	8410.52	38.20	-0.70	1974.37
Produce Tax	-115558	103760	162.69	1963.35	12.07	13.57	1301.30
Profit And Tax Per Capita	-33735	31533	5.61	377.50	67.24	-2.47	4497.77

(3) Modeling and Analysis

We use AMOS4.0 for our modeling with the Maximum likelihood method and run the 4 theoretical models mentioned above. The result indicates that the confirmatory factor analysis model is the best one to fit our data.

After some modifications of the model, we settle down with the model result showed by Chart 9. It has a fitted effect as: GFI=98.8%，AGFI=93.8%，higher than 90%,which means a very good fitted effect. RMSEA=0.1.And we can see from result 4 that the path coefficients can reflect their own contribution to the value added factor.

Finally we choose the simple and well-fitted Confirmatory Factor Analysis model as our estimation model.

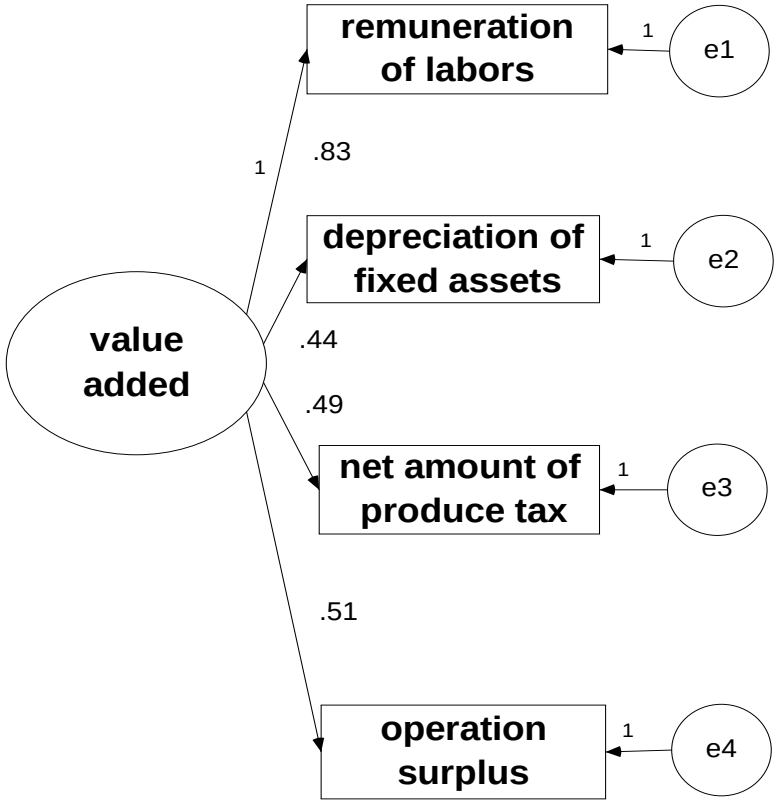

Chart 9 The Result Of The Confirmatory Factor Analysis Model

Result 4

	Estimate	S.E.	C.R.	P
Z remuneration of labors <--value added of cultural industry	0.834	0.007	111.896	0
Z depreciation of fixed assets <-- value added of cultural industry	0.437	0.007	66.081	0
Z net amount of produce tax <-- value added of cultural industry	0.49	0.007	73.778	0
Z operation surplus <-- value added of cultural industry	0.51	0.007	76.641	0

We can also learn from result 4 that remuneration of labors has the largest factor loading on value added，which is 0.834. It indicates that the cultural industry of China mainly depends on the input of manpower, and the wealth created also pay to the employee as remuneration. As an activity of brain work, it is the feature of cultural industry taking advantage of the creativity, technique and wisdom of people.

As the representative of the revenue, the operation surplus factor also have a larger loading of 0.51,which means the operating status of the cultural corporations are not so bad.

And the net amount of produce tax factor has a loading of 0.49, indicating the actions of the government still supporting the development of cultural industry, but the correlations between them is not so strong. As cultural industry is supported strongly by the government, the allowance of this industry is relatively high. If the allowance income is not considered, the correlation between the product tax and value added is 0.62, but if the government allowance is minus, the correlation between the net product tax and value added decrease to 0.40. However, only when the corporations could take charge of the market can the cultural industry realize a high speed development.

According to the model, we can get the formula below by calculating the scores of factors to estimate the value added. The indexes in the brackets are the real indexes.

Z-value added = 0.419* Z-remuneration of labors + 0.295*Z-depreciation of fixed assets + 0.352*Z- net amount of produce tax + 0.352*Z-operation surplus

Noticeably, our estimation is base on the standardized factors of the variables, hence, our estimation result is standardized value added, denoted as ***Z-value added.***

According to the analysis of the model base on corporations' data, it is recognized that, the produce structure of an industry is stable in a certain period, namely, the relationship between value added and these produce elements is relatively stable. Hence we can take advantage of the SEM to estimate its structure, and validate actual data by our model to improve our data quality.

(4) Practical Application

After the analysis above, we can conclude that if the sample size is large enough, generally large than 200, and the data is stable in distribution, we could get relatively accurate estimation by our model and use the result to adjust the result of conventional method. Not only can it evaluate the quality of collected data, but it also insures the accuracy of the value added of cultural industry. And in the year of economy general survey, aimed at the common method of ***value***

added=remuneration of labors + depreciation of fixed assets + net amount of produce tax + operation surplus, we can verify and modify our value result by our model, evaluating our data in a new angle.

Remarkably, different sample, different years and different areas lead to different models, for the change of structure. So, our factor loading can only be use in our case, and the Confirmatory Factor Analysis model might not be the best one. We just want to verify the feasibility of the method, but not public a general model. For different data, one should eliminate abnormal data first, then analysis its distribution and find the analyzable sample. Finally set up models and run them to find a better one by comparison.

The ultimate purpose of our research is to build value added estimation model by high quality practicality data and some value indexes data. As our model above can not absoluttly reach our anticipation, the next step of our research will start from the collection of high quality volume and value indexes data. Actually, the transformation of accounting method should be accompanied by a big adjustment of the content of corporation data we collected.

5 Discussion and Challenges of the Method

After the attempts above, we have realized our original intention to estimate and verify the most concerned index—value added by relatively accurate sub industry practicality data. By comparison, if pay more attention to the corresponding city data and its operating revenue, we can get a better estimation effect.

Of course, our estimation is just an attempt to use different data and new methods such as SEM and factor analysis to validate the published data. When the value added data is needed in other research, we recommend using the published data.

Although we have no access to more comprehensive practicality data of the cultural corporations to build the optimal model, from the case of city data we realize that the statistical information of cultural activities does exist and is easy to implement. If we get abundant data, the estimation will be more objective and more reliable.

To estimate the value added of service industry by modern statistic method is a new attempt to dig out information form practicality data and build up the bridge to joint it with value data. It is propitious for corporations to provide more data without the concern about sensitiveness and reduce the problem of value accounting. It also split the statistical data with accounting and financial data to improve the quality of the whole statistical work.

In a word, if the statistical report system of China can be reformed and provide more high quality practicality data, models following our thread will get better fitted effect. And if the matching statistics of cities ad corporations are improved, more macro econometric model can be used.

Situation permitted, we can pick put some corporations of each sub-industry by random sampling and take tracking survey to get their accurate data. With its representativeness, some proportion index of value added can be calculated. For example, the proportion of value added in the ticket incomes of one movie or the proportion of value added in the price of a book. We can use them to guide our accounting work and modeling.

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APPENDIX

Appendix 1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.915[a]	.837	.834	15533.64212

a. Predictors: (Constant), films, theater, artplace, artteam, shows

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3E+011	5	6.943E+010	287.742	.000[a]
	Residual	7E+010	280	241294037.4		
	Total	4E+011	285			

a. Predictors: (Constant), films, theater, artplace, artteam, shows

b. Dependent Variable: artic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8066.295	1114.566		7.237	.000
	artteam	-665.832	105.975	-.651	-6.283	.000
	artplace	1874.518	194.380	.680	9.644	.000
	theater	174.522	36.632	.330	4.764	.000
	shows	-5318.706	1218.022	-.576	-4.367	.000
	films	5543.433	513.681	.781	10.792	.000

a. Dependent Variable: artic

Appendix 2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.943[a]	.888	.888	7335.59036

a. Predictors: (Constant), books, libpeople

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1E+011	2	6.058E+010	1125.750	.000[a]
	Residual	2E+010	283	53810885.97		
	Total	1E+011	285			

a. Predictors: (Constant), books, libpeople

b. Dependent Variable: libic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	623.851	517.033		1.207	.229
	libpeople	2.587	.696	.134	3.715	.000
	books	4.216	.185	.827	22.849	.000

a. Dependent Variable: libic

Appendix 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.706[a]	.499	.497	31363.93935

a. Predictors: (Constant), culexhibit

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3E+011	1	3.035E+011	308.567	.000[a]
	Residual	3E+011	310	983696691.6		
	Total	6E+011	311			

a. Predictors: (Constant), culexhibit

b. Dependent Variable: culic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3765.085	1968.957		1.912	.057
	culexhibit	21.299	1.213	.706	17.566	.000

a. Dependent Variable: culic

Appendix 4

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783[a]	.613	.610	412646.699

a. Predictors: (Constant), club, gamehall

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8E+013	2	3.817E+013	224.156	.000[a]
	Residual	5E+013	283	1.703E+011		
	Total	1E+014	285			

a. Predictors: (Constant), club, gamehall

b. Dependent Variable: culbmic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	41108.778	26372.171		1.559	.120
	gamehall	-1694.956	345.170	-.789	-4.910	.000
	club	1541.000	161.868	1.529	9.520	.000

a. Dependent Variable: culbmic

Appendix 5

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.912[a]	.832	.831	6127.70809

a. Predictors: (Constant), students

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6E+010	1	5.762E+010	1534.594	.000[a]
	Residual	1E+010	310	37548806.42		
	Total	7E+010	311			

a. Predictors: (Constant), students

b. Dependent Variable: eduic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	512.904	377.716		1.358	.175
	students	32.428	.828	.912	39.174	.000

a. Dependent Variable: eduic

Appendix 6

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.580[a]	.336	.334	6378.01082

a. Predictors: (Constant), project

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6E+009	1	6395274414	157.213	.000[a]
	Residual	1E+010	310	40679022.05		
	Total	2E+010	311			

a. Predictors: (Constant), project

b. Dependent Variable: rdic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1270.394	395.869		3.209	.001
	project	713.249	56.885	.580	12.538	.000

a. Dependent Variable: rdic

Appendix 7

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.964[a]	.929	.928	19429.62182

a. Predictors: (Constant), relicprotect, relics, visitpeople

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2E+012	3	5.065E+011	1341.648	.000[a]
	Residual	1E+011	308	377510204.0		
	Total	2E+012	311			

a. Predictors: (Constant), relicprotect, relics, visitpeople

b. Dependent Variable: relicic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-111.510	1244.203		-.090	.929
	visitpeople	31.319	.966	.790	32.413	.000
	relics	.065	.005	.276	13.143	.000
	relicprotect	-152.860	46.551	-.063	-3.284	.001

a. Dependent Variable: relicic