



Research Article

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Status quo and forecast of foreign literature studies based on statistical and forecasting analysis

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ABSTRACT

Foreign literature is an important channel to spread foreign culture. Culture may inspire people, let soar their imagination and influence their lifestyle. China's culture industry needs to integrate cultures of other nations for its own development. Thus, it is significant to study foreign literatures. Through the study of the status quo, development trend and prediction about foreign literature, this paper intends to explore the development direction of foreign literature theoretically and clear the purpose of foreign literature studies with data so as to lay a foundation for China's cultural development. From a theoretical perspective, this paper focuses on the status quo and the development trend of foreign literature studies, which is a basis for later studies. This paper analyzes the number of papers issued on core periodicals for foreign literature in China from 2004 to 2011 and hot issues from 2004 to 2005, 2006 to 2008 and 2009 to 2011. Through single sequence order linear dynamic model, a prediction on the annual number of National Social Science Fund Project for 2012 to 2016 has been made, serving as the database for further foreign literature studies.

Key words: Foreign literature; status quo; trend analysis; simple sequence-linearity; forecast

INTRODUCTION

As China's economy is intertwined with the world's economy, it is necessary to know about foreign culture in the process of international information exchange and idea spreading. Foreign literature is the exact tool that we can use. Focusing on the status quo and the development trend of foreign literature, this paper makes qualitative and quantitative prediction, in order to promote China's foreign literature studies.

Many researchers have studied these issues. Qian Aibing (2010) adopted citation analysis and did a statistical analysis on foreign papers' citation of books. He concluded 92 most influential academic works in this field, both home and abroad. His study focused on the source of the literature with brief introductions on some widely cited works and commented on their academic influence [1]. Yan Jie (2013) selected research projects in the past decade as research objects with a statistical analysis on type, unit and regional distribution. While studying the target and the successful rate of project application, she proposed useful suggestions on the application [2]. Yang Xin et al (2014) used knowledge mapping tool to conduct annual visualization analysis and showed the trend of research focus of foreign literature from 2000 to 2011[3].

Based on previous researches, this paper focuses on the status quo and the development trend of foreign literature studies and intends to provide guidance on foreign literature study.

2. SUMMARIZING CHINA'S STATUS QUO AND FUTURE TREND OF FOREIGN LITERATURE STUDIES

2.1 STATUS QUO

As an important part of the academic research, foreign literature has been studied with different focus since 1949. In

recent year, achievements have been made both on the number and the quality of foreign literature research. According to periodical content issued in 2013, papers about foreign literature and citations collected by CSSCI from 2007 to 2011 are shown in Table 1.

Tab. 1: Papers about foreign literature and citations collected by CSSCI from 2007 to 2011

Year	Literature as source (Number of paper)	Literature as citation (Number of paper)	The average citation (Number of paper)	Paper with citation (Number of paper)	Paper without citation (Number of paper)	The ratio of paper with citation to paper without citation
2007	999	7007	7.87	703	139	5.06
2008	1097	7392	7.38	730	210	3.48
2009	1141	8481	8.76	816	168	4.86
2010	1167	8839	9.02	815	195	4.18
2011	1420	10704	8.89	1035	228	4.54
总计	5824	42423	41.92	4099	940	4.36

According to Table 1, we can get Fig.1, the annual number of papers about foreign literature and citations collected by CSSCI from 2007 to 2011.

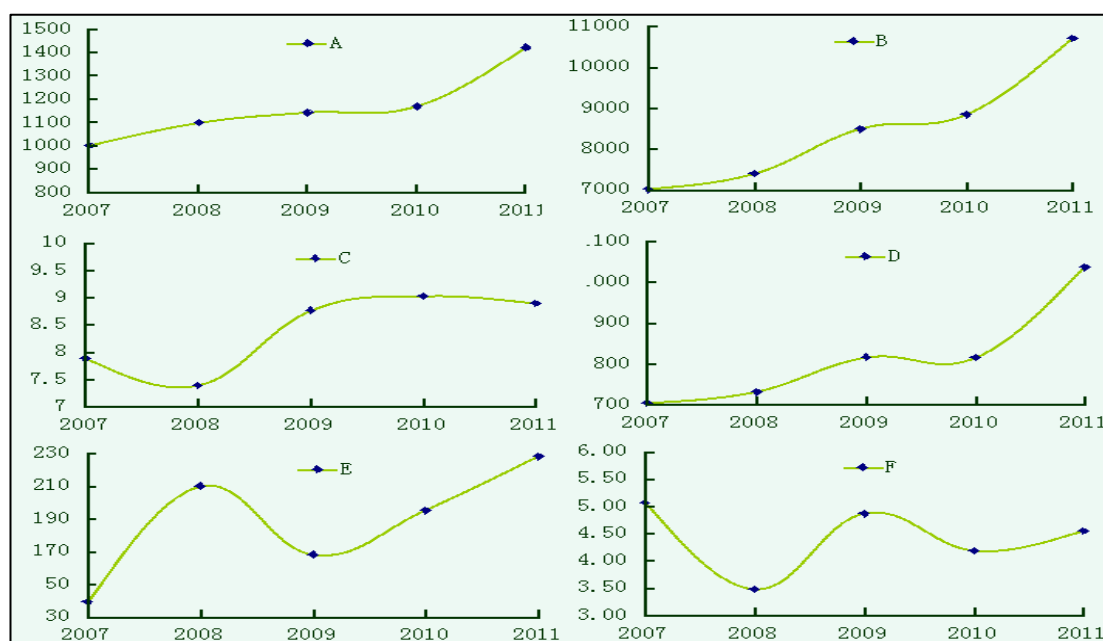


Fig.1 The annual number of papers about foreign literature and citations collected by CSSCI from 2007 to 2011

From Fig.1 and Table 1, we can see scholars are good at using others' research results. The ratio of papers with citations and without citations is stable. The number of literature as sources increased by 42.14% from 2007 to 2011 and that of literature as citations, by 52.76% from 2007 to 2011, indicating that China's study on foreign literature is growing.

2.2 development trends

Foreign literature seeks for idea expression and reviewing historical process in an artistic way. The aesthetic and political arguments are more often than not related to the world. The development trend of foreign literature can be divided into six aspects, namely, literature after postmodernism, reflection on science and technological civilization and new trend of ecological literature, historical writing and the revival of historical literature, consumer culture and urban literature, the development of post 911 literature and transformation of creation and aesthetic pursuit.

From Table 1, we can see the trend of the foreign literature studies present the following features:

1) The study is based on details and intends to discover the creative themes, excavate the specific meaning of the text, pays attention to hero's destiny and finds out the stance and taste of the author.

Tab. 2: Six development trends of foreign literature studies

Type	Details
literature after postmodernism	The world's cultural framework inherits the tradition and shows some innovative points. Authors use A variety of creative techniques with modern logo to disclose the theme of the era. After the post modernism, foreign literature presents new trend of development. Relevant studies have integrated aesthetic pursuit, innovative idea aesthetic feature; compose method as well as historical and cultural background. They hope to explain elements that foreign writers use in their works and extend the aesthetic trace in history and reality.
reflection on science and technological civilization and new trend of ecological literature	Cloning, virtual space and the development of space constantly penetrate into people's mind. But people are too obsessed with technology. The swelling anthropocentrism is the source of ecological and spiritual crisis and is subject to various doubts. Many foreign writers responded to such comment and expressed their own reflection and ecological awareness, including Japanese-British author Kazuo Ishiguro, Canada's Atwood, America's DeLillo, Ireland's Banville, Australia's Carey and Nobel Prize winner Kenzaburo Oe of Japan. Their works reflected technological civilization and ecological awareness from different perspectives.
historical writing and the revival of historical literature	Whatever the era, historical literature is always a love for writers. This period is no exception. Authors put an emphasis on the history but they do not overlook the survival condition of the reality. They hope that people can feel the burden of life while reviewing the past and be calm enough to meet the challenges. This is where the foreign literature goes. Such trend influences the research on foreign literature and researches should probe into how the foreign literature refers to history and constructs the suitable historical reality as the background of the composition.
consumer culture and urban literature	Urbanization is proceeding in depth, resulting in a change of survival way and exchange idea. Urban life is heavily influenced by consumer culture. Authors are sensitive to life and snap the beauty with their pens. But their eyes penetrate the seemingly prosper and witness the uncontrollable factor behind. In their works, modern people's lost, frustration and decay are given to full play and lead the trend of consumer culture and urban literature. Researchers need to decipher the deeper meaning of the culture, reveal authors' intention and promote the spread of culture.
the development of post 911 literature	9.11 is a nightmare for the super power, USA, which led the reflection on military strength and national security. Anti-terrorist war after the Cold War is what world citizens are facing with. Authors draw inspiration from that and show the contradiction between super power and security. Researchers are expected to analyze the cultural divergence of works.
transformation of creation and aesthetic pursuit	Foreign literature adheres to the tradition of modernist literature and changes the creation form from aesthetic method of expanded realism and neo-realism. This requires researches to be free from the reading of cultural and political ideology and combines the theme study with aesthetic pursuit to discover the aesthetic value of literature.

2) Pay attention to potential nationalism, personal qualities and moral essence. These are basic requirements for further researches.

3) Study on different perspectives of the work and probe into the writing technique. Find different perspectives between mature writers and young writers.

4) Enhance the reflection on theory and discuss the integration of regionalism and trans-boarder culture. A multi-dimensional perspective of regionalism, time and space, race and property will be the trend of foreign literature.

5) Think dialectical and understand the spiritual penetration and criticalness of human nature.

3. DATA ANALYSIS OF CHINA'S STATUS QUO OF FOREIGN LITERATURE RESEARCH

China's foreign literature studies issued on core periodicals from 2004 to 2007 are shown in Table 3 with the number of periodicals and the annual number of papers.

Tab. 3: Foreign literature studies issued on core periodicals from 2004 to 2007

Year	Number of periodicals	Number of papers	Year	Number of periodicals	Number of papers
2004	6	649	2008	6	613
2005	6	615	2009	6	592
2006	6	590	2010	6	649
2007	6	572	2011	6	642

According to Table 3, we can get the corresponding tendency chart, as Fig.2.

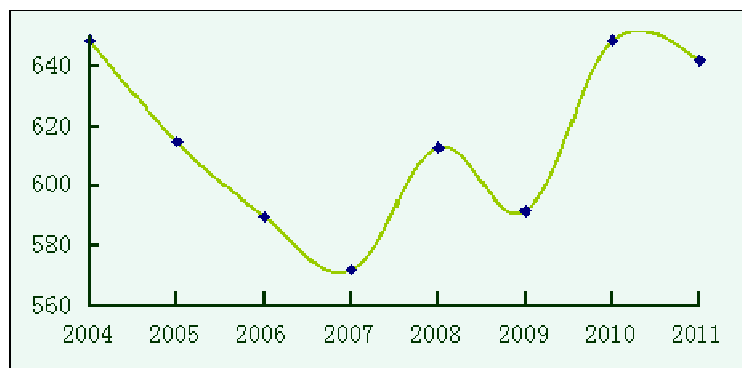


Fig.2: Foreign literature studies issued on core periodicals from 2004 to 2011

From Table 2, it is clear that the number of papers issued is on the decrease from 2004 to 2007 and experiences a fluctuation between 2007 and 2009. 2008 issued the largest number of papers and 2009 and 2010 witnessed the increasing number of papers, the trend of which was reversed in 2011.

In terms of hot issues of research, foreign literature periodicals can be divided into three phases, 2004-2005, 2006-2008 and 2009-2011, as is shown in Table 4 with key word and frequency.

Tab. 4: Hot issue and frequency in three phases

Phase one Key word		2004~2005	Phase two Key word		2006~2008	Phase three Key word		2009~2011
A1	Poem	14	B1	American literature	132	C1	American literature	33
A2	French literature	14	B2	Russian literature	98	C2	Russian literature	25
A3	Literature translation	14	B3	British literature	89	C3	Poem	21
A4	Interview record	13	B4	Literature translation	62	C4	History	20
A5	Biography	12	B5	Book review	57	C5	Ecological criticism	20
A6	Novel compose	12	B6	Novel	44	C6	British literature	19
A7	American novel	12	B7	Poem	29	C7	Literature	15
A8	Comparative literature	12	B8	Literature research	28	C8	Identity	14
A9	Easternism	12	B9	German literature	26	C9	Literature compose	14
A10	Literature research	11	B10	foreign literature	26	C10	Novel	14
A11	Ecological criticism	11	B11	Novel compose	25	C11	Literary criticism	13
A12	Romanticism	11	B12	French literature	24	C12	Post modernism	13
A13	Ideology	11	B13	Literary criticism	23	C13	Modernism	13
A14	Post modern	11	B14	Contemporary literature	22	C14	Coetzee	13
A15	Canadian literature	10	B15	Post modernism	21	C15	Literature work	13

According to Table 4, here is Fig. 3 in which hot issue and frequency in three phases are shown in chart.

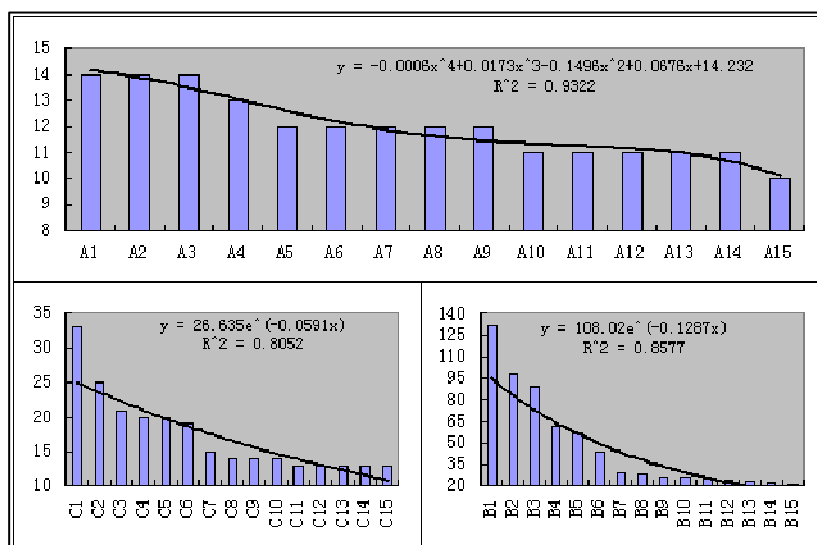


Fig. 3 Hot issue and frequency in three phases

4. FORECAST OF FOREIGN LITERATURE STUDIES' TRENDS BASED ON SIMPLE SEQUENCE-LINEARITY DYNAMIC MODEL

4.1 Data process theory and results

Subject original data to certain requirements. Though the data can be messy, they have inner regularity for sure. It is hard to detect the inner regularity from original data. Thus, these data should be transformed.

Common processing methods are: accumulative generation, mean generation and level comparison generation. This paper uses the accumulative data generation process by adding up data of each moment. Series of numbers before accumulation is called original series of numbers and after accumulation is called generating series of numbers. This method turns grey data to white data and shows the tendency in the accumulative process with a clear regularity.

Original series of number is expressed as $x^{(0)}$, then $x^{(0)} = [x^{(0)}(1), x^{(0)}(2), x^{(0)}(3), \dots, x^{(0)}(n)]$. Generating series of number is expressed as $x^{(1)}$, then $x^{(1)} = [x^{(1)}(1), x^{(1)}(2), x^{(1)}(3), \dots, x^{(1)}(n)]$. $x^{(1)}(k)$ fits expression (1).

$$x^{(1)}(k) = \sum_{i=1}^k x^{(0)}(i); k = 1, 2, 3, \dots, n \quad (1)$$

Expression (1) is called one time accumulation or 1-AGO (Accumulating Generation Operator). But sometimes, one time accumulation cannot fully present the regularity and needs r times of accumulation. The expression is:

$$x^{(r)}(k) = \sum_{i=1}^{k-1} x^{(r-1)}(i) + x^{(r-1)}(k) = x^{(r-1)}(k-1) + x^{(r-1)}(k) \quad (2)$$

$$x^{(r)}(k) = \sum_{i=1}^k x^{(r-1)}(i) = \sum_{i=1}^k \left(\sum_{j=1}^i x^{(r-2)}(j) \right)$$

Accumulative generation will turn a non-negative series of number to an incremental featuring non-fluctuated and non-decreasing. Data from the National Social Science Fund project are processed and shown in Table 5.

Tab. 5: Original data and processed data

Year	Original data				Processed data			
	A Key	B Common	C Youth	D Total	A Key	B Common	C Youth	D Total
2004	20	0	6	26	20	0	6	26
2005	0	23	8	31	20	23	14	57
2006	2	22	9	33	22	45	23	90
2007	0	21	10	31	22	66	33	121
2008	0	24	12	36	22	90	45	157
2009	1	25	10	36	23	115	55	193
2010	0	30	25	55	23	145	80	248
2011	0	58	26	84	23	203	106	332
Total	23	203	106	332	/	/	/	/

From Table 5 we can get the single sequence number trend of key project, common project, youth project and the total number, as is shown in Fig. 4.

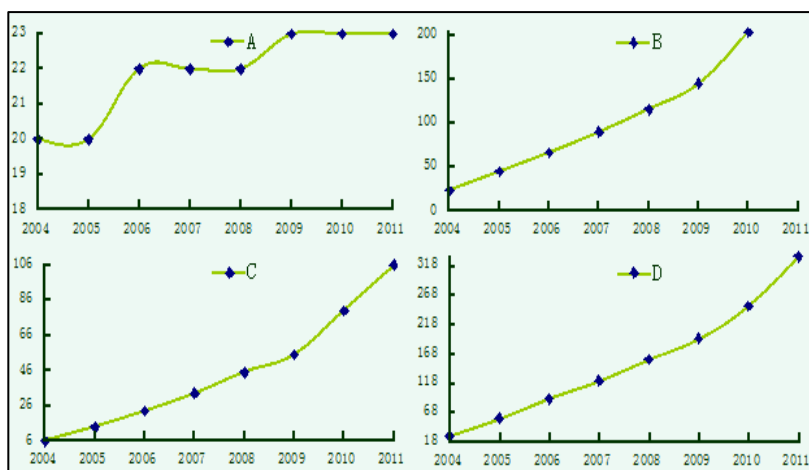


Fig. 4 Processed data changing with year

4.2 Model construction and prediction

GREY MODEL(n , h) is abbreviated as GM(n , h). n refers to the order of differential equations; h refers to the number of variables; n and h in the first order single sequence dynamic models are 1 and known as GM(1.1) model, as in expression (3).

$$\frac{dx}{dt} + ax = u \tag{3}$$

According to the definition of derivative: $\frac{dx}{dt} = \lim_{\Delta t \rightarrow 0} \frac{x(t + \Delta t) - x(t)}{\Delta t}$. When Δt is close to unit 1, there is:

$$\frac{dx}{dt} \approx \frac{\Delta x}{\Delta t} = x(t+1) - x(t) = \Delta^{(1)}(x(x+1)) \tag{4}$$

$\frac{\Delta x}{\Delta t}$ refers to the one time inverse accumulative generation of $x(k+1)$. It is also the binary combinatorial equivalent of $x(k+1)$ and $x(k)$. We name it as even and record it as $[x(k+1), x(k)]$. Define a mapping F, as expression (5):

$$F : [x(k+1), x(k)] \rightarrow \frac{dx}{dt} \tag{5}$$

Define $z(t)$ as the background value of $\frac{dx}{dt}$ at t . Record the average of the even as the background value, there is $z(t) = \frac{1}{2} [x(k) + x(k+1)]$.

According to (1)-(5), we can get the albino form of differential equations, as (6):

$$\frac{dx^{(1)}}{dt} + ax^{(1)} = u \tag{6}$$

a, u are underdetermined equation. Expression (6) can be discretized to (7)

$$\Delta^{(1)}(x^{(1)}(k+1)) + az^{(1)}(x(k+1)) = u \tag{7}$$

In expression (7), $\Delta^{(1)}(x^{(1)}(k+1))$ is an inverse accumulative generation sequence at time $(k+1)$. $z^{(1)}(x(k+1))$ is the background value of $\frac{dx^{(1)}}{dt}$ at time $(k+1)$.

As there is:

$$\begin{aligned}\Delta^{(1)}(x^{(1)}(k+1)) &= x^{(1)}(k+1) - x^{(1)}(k) = x^{(0)}(k+1) \\ z^{(1)}(k+1) &= \frac{1}{2}(x^{(1)}(k+1) + x^{(1)}(k))\end{aligned}\quad (8)$$

Substitute (8) to (7) and get (9):

$$x^{(0)}(k+1) = a \left[-\frac{1}{2}(x^{(1)}(k) + x^{(1)}(k+1)) \right] + u \quad (9)$$

Expand (9) to acquire (10):

$$Y = \begin{bmatrix} x^{(0)}(2) \\ x^{(0)}(3) \\ x^{(0)}(4) \\ \vdots \\ x^{(0)}(n) \end{bmatrix} \quad B = \begin{bmatrix} -\frac{1}{2}(x^{(1)}(1) + x^{(1)}(2)) & 1 \\ -\frac{1}{2}(x^{(1)}(2) + x^{(1)}(3)) & 1 \\ -\frac{1}{2}(x^{(1)}(3) + x^{(1)}(4)) & 1 \\ \vdots & \vdots \\ -\frac{1}{2}(x^{(1)}(n-1) + x^{(1)}(n)) & 1 \end{bmatrix} \quad (10)$$

Suppose $\Phi = [a \quad u]^T$ is the vector for the parameter to be identified. Then (10) is rewrote to (11):

$$Y = B\Phi \quad (11)$$

Parameter vector Φ can be subject to exponential Smoothing predictive value to confirm the content type (12)

$$\hat{\Phi} = [\hat{a} \quad \hat{u}] = (B^T B)^{-1} B^T Y \quad (12)$$

Substitute the parameter to expression (6) and get the discrete solution as (13)

$$x^{(1)}(k+1) = \left[x^{(1)}(1) - \frac{\hat{u}}{\hat{a}} \right] e^{-\hat{a}k} + \frac{\hat{u}}{\hat{a}} \quad (13)$$

Turn to the original data, there is expression (14)

$$x^{(0)}(k+1) = (1 - e^{-\hat{a}}) \left[x^{(1)}(1) - \frac{\hat{u}}{\hat{a}} \right] e^{-\hat{a}k} \quad (14)$$

With the abovementioned mechanism, we can get the prediction of key project, common project, youth project and the total number of project from 2012 to 2016, as is shown in Table 4.

Tab. 6: Prediction on National Social Science Fund Project about Foreign Literature

Year	Annual project				Accumulated annual project			
	A Key	B Common	C Youth	D Total	A Key	B Common	C Youth	D Total
2011	0	58	26	84	23	203	106	332
2012	1	52	40	93	24	255	146	425
2013	0	13	17	56	25	268	163	481
2014	1	44	38	97	26	312	201	578
2015	0	63	43	105	26	375	244	683
2016	1	68	47	114	27	443	291	797

CONCLUSION

This paper first introduces the status quo of the trend of foreign literature studies and attaches the number of papers and citations collected in CSSCI from 2007 to 2011. It illustrates the development trend of foreign literature and proposes requirements on foreign literature studies. Then, it uses chart and figure to show the status quo of foreign literature studies and analyzes the annual number of papers issued in core periodicals. It also discusses the hot issues of the three phases. Finally, through single sequence order linear dynamic model, it makes a prediction on the annual number of National Social Science Fund Project for 2012 to 2016 and concludes the development trend of foreign literature studies.

However, there are still drawbacks of this paper. GIS space analysis on core periodicals of different regions will better illustrate the point. But this paper is easy to understand and calculate.

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