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Frontier and Evolution of Marketing Discipline Based on Scientific Metrological Analysis of Top 4 Marketing Periodicals in 2009 – 2013

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Abstract Using scientific metrological method, this paper analyzed all literature published by top 4 marketing periodicals (JCR, JM, JMR, and MS) in 2009 – 2013. It is intended to find out hot issues and frontier topics of current marketing research through cluster analysis of key words, get to know cooperation and exchange of organizations through analysis of organization cooperative network, explore new topics of marketing researches with the aid of analysis of abrupt change words, and explore evolution path and development rules of marketing researches through co-citation network analysis.

Key words Top 4 marketing periodicals, Citespace, Literature metrology, Mapping knowledge domain

1 Introduction

Marketing activities originate from exchange act of human beings. Barter activities promoted development of commodity circulation, and works of commodity circulation appeared accordingly^[1]. Although the earlier Marketing discipline was not influenced from such works, this does not mean the "Marketing" term is widely accepted, and the real Marketing appeared after the 1900s^[2]. The Marketing discipline has experienced development of more than a hundred years, but the scientific research of the Marketing discipline in real sense only has a history of fifty years^[3]. With gradual improvement of the discipline knowledge and expansion of size of academic researches, there appear numerous academic periodicals in the Marketing discipline field. Academic periodical is final home of Marketing discipline researches, and development of periodicals is also important manifestation of the discipline development. Any discipline has its own development and evolution history, and there are inevitable quantitative description and statistical analysis of the discipline in the evolution process^[4]. The Marketing discipline is no exception. When the Marketing develops to certain scale, preliminary quantitative description and analysis of Marketing discipline researches appear, and such research belongs to early stage scientific metrology. In fact, the application of scientific metrology in the Marketing discipline has a long history, and research objects are mainly periodicals and literature. As early as in 1988, Malhotra analyzed all literature in Journal of Marketing Research in 1980 – 1986 by frequency statistic analysis method, and found that regression analysis was the method with most frequent application, followed by the analysis of variance (ANOVA)^[5]. Fisk *et al* (1993) analyzed the Service Marketing periodical in 1952 – 1992, and found that since 1986, the strict-

ness of empirical and theoretical researches of service marketing was improving constantly, and research topics were concentrated on service quality, service experience, service design, relationship marketing and internal marketing^[6]. Baumgartner and Pieters (2003) distinguished five specific fields of Marketing Discipline for 49 periodicals by citation analysis method and ranked periodicals of each field according to influence power^[7]. Polonsky *et al* (2005) tested consistency of research reports about rank of periodicals, and found that those researches showed some consistency, but the consistency was manifested in top periodicals, not in comments of general periodicals^[8]. In China, there are also scholars engaged in metrological analysis of Marketing Discipline. For example, Yu Manjiao (2005) analyzed current situations of Marketing Discipline from current situations of marketing periodicals. Li Weiwei and Lu Hongtai (2008) analyzed periodicals published in Journal of Consumer Research in 1998 – 2007. Through word frequency analysis, they found hot spots of consumer behavior researches, and further elaborated future research direction^[9].

In this study, we made scientific metrological analysis of all literature published in top 4 marketing periodicals in 2009 – 2013, described new trend of international cooperation, and made effort to explore frontier and evolution of Marketing Discipline, so as to reveal new development trend of Marketing Discipline and study historical evolution path of Marketing Discipline.

2 Research design

2.1 Research methods The literature metrological analysis method is a quantitative analysis method of describing current situations and predicting future development trend of a discipline by taking external characteristics of scientific literature as analysis objects, taking statistics of output content as characteristics of quantitative information, and taking mathematics and statistics as basis. It mainly consists of analysis of number of articles annually published, analysis of authors, word frequency analysis, and citation analysis^[10].

Received: October 22, 2015 Accepted: December 5, 2015

Supported by Project of National Natural Science Foundation (71273102); Fundamental Research Funds for the Central Universities (2012RW004).

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Mapping Knowledge Domains is used to describe a newly evolving interdisciplinary area of science aimed at the process of charting, mining, analyzing, sorting, enabling navigation of, and displaying knowledge. This field is aimed at easing information access, making evident the structure of knowledge, and allowing seekers of knowledge to succeed in their endeavors, to reveal development process and structural relationship of scientific knowledge, create knowledge-sharing environment in organizations, so as to promote cooperation and deepening of scientific and technological researches^[11]. In Mapping Knowledge Domains, interaction relationship between discipline frontiers is manifested in the spatial form. Through citation cluster analysis, especially the studies on net-like relationship between citations, it is able to explore cross, penetration and derivation trend of related disciplines, and analyze background, development situations, breakthrough researches, mutual penetration, and frontier development of certain discipline, to further reveal dynamic structure and development rules of the discipline^[12].

2.2 Selection of analysis objects and data source Since the first marketing periodical, Journal of Retailing, came into being in 1952, a series of marketing periodicals spring up in large numbers. In 1936, Journal of Marketing was formally set up; in 1948, and 1959, Journal of Business Research and International Journal of Market Research were set up separately. Now, these 4 periodicals have been indexed by SSCI. Since the 1960s, marketing periodicals have been developing like a raging fire. With increase of number of marketing periodicals, how to evaluate these periodicals has become an important issue in academic circle of Marketing Discipline. Evaluation of periodicals is of great significance for improvement of their quality, and also an essential criterion for bringing their social functions into full play. In 1979, Becker and Browne firstly proposed evaluating marketing periodicals using certain perception criteria. Polonsky and Walker (1993) studied marketing academic circle in the Asian-Pacific area, scholars in the Asian-Pacific area recognized top 4 marketing periodicals are JMR, JM, JCR, and MS. KoojaroenPrasit (1998), Theoharakis (2002), Mort (2004), Pofonsky (2006), and Hult (2009) reached the conclusion consistent with Polonsky and Walker (1993) from different evaluation perspectives. However, the comments of the above scholars are subjective and have personal feelings, so it is not persuasive. From objective perspective, Guldry et al (2004) ranked marketing periodicals as per number of citations, and obtained top 4 marketing periodicals: JMR, JM, JCR, and MS. From the perspective of citation analysis, Moussa and Touzan (2010) analyzed references in papers using Google-scholar data, and obtained top 4 marketing periodicals: JM, JMR, JCR and MS. These indicate that JCR, JM, JMR, and MS are actual top 4 marketing periodicals from both subjective and objective perspectives. Here, we took literature published in these top 4 periodicals in 2009–2013 as analysis objects. Specific ranks of top 4 periodicals are not major issue of our study.

Data in this study were selected from Web of Sciences of In-

stitute for Scientific Information (ISI), the periodicals are Journal of Marketing Research (JMR), Journal of Marketing (JM), Journal of Consumer Research (JCR) and Marketing Science (MS). We obtained 1419 papers published in 2009–2013. The results were derived in the form of text and taken as basic research data. The downloading of all data was completed on December 22, 2014.

3 Literature metrological analysis

3.1 Analysis of number of articles annually published The number of articles published refers to number of papers published in certain period. It is an essential indicator for evaluating whether information content of a periodical is rich and it is of great reference significance for evaluating academic influence. Through analysis of number of articles published in top 4 marketing periodicals (in Table 1), the number of articles published annually in JCR ranked the first, and the total of articles published in JM was the least. The number of articles published annually in every periodical is not stable, and even it is not stable in each issue, mainly because the number of articles published is adjusted according to number of contribution sources^[13]. To a certain extent, the increase in number of articles published implies increase in number of contribution sources. However, the drop of number of articles published does not mean drop of number of contribution sources because some contributions may be not excellent or not consistent with columns of the periodical.

Table 1 Distribution of number of articles annually published in top 4 marketing periodicals

	2009	2010	2011	2012	2013	Average annual	Total
JCR	78	77	75	87	79	79.2	396
JMR	77	92	93	72	54	77.6	388
JM	63	49	63	48	48	54.2	271
MS	87	72	77	69	59	72.8	364

3.2 Analysis of authors According to Price Law, the number of articles published by core authors $m = 0.749 * (n_{\max})$ (the number of authors with the largest number of articles published). Statistical analysis indicated that Professor Kumar Vineet from Harvard University published articles as most as 13 in top 4 marketing periodicals, so 2.7. There were 144 core authors publishing articles more than 3 articles. Due to limit of page space, we here listed only those core authors publishing articles more than 8. As indicated in Table 2, most authors came from higher education colleges and universities, and American colleges and universities took up the first place.

3.3 Citation frequency analysis Citation of scientific literature manifests inheritance and use of scientific knowledge and information. Literature cited performs meritorious deeds in academic relevance and inheritance, and also lays solid foundation for development and progress of future academics. Frequency of citation is an essential indicator for citation analysis. It can objectively re-

flect citation frequency of articles by other scholars, and also can visually reflect the degree of use of the periodical^[14]. Table 3 listed citation frequency of top 4 marketing periodicals in 2009 –

Table 2 List of core authors

No.	Authors	Universities	Number of articles	No.	Authors	Universities	Number of articles
1	V. Kumar	Harvard University	13	8	Darren W. Dahl	Columbia University	9
2	Pradeep K. Chintagunta	University of Chicago	11	9	Kannan Srinivasan	Stanford University	9
3	Eric T. Bradlow	University of Pennsylvania	11	10	Dmitri Kuksov	University of Texas at Dallas	8
4	Christian Homburg	University Mannheim	10	11	Katherine White	University of British Columbia	8
5	Jennifer J. Argo	University of Alberta	10	12	J. Jeffrey Inman	University of Texas	8
6	Greg M. Allenby	The Ohio State University	10	13	Yuxin Chen	Northwestern University	8
7	Jonah Berger	University of Pennsylvania	9	14	Gerard J. Tellis	University of Southern California	8

Table 3 Citation frequency analysis

	2009	2010	2011	2012	2013	Annual citation frequency
JCR	16	188	498	897	1342	588.2
JMR	54	180	430	762	1110	507.2
JM	33	198	646	1011	1422	662.0
MS	41	150	367	558	800	383.2

4 Mapping Knowledge Domains analysis

Firstly import the relevant text data into Citespace software, and then select visual subject according to analysis content. In this study, we made visual mapping knowledge domains analysis on literature published in top 4 marketing periodicals in recent 5 years from institutional cooperation analysis, key word analysis, core literature analysis, hot spot evolution, and mutation analysis.

4.1 Analysis of cooperative network of research institutions

Research institutions are not only major organizations of academic research, but also important output base of academic achievements. Through visual mapping knowledge domains analysis of institutional cooperative network, we obtained Fig. 1. In Fig. 1, size of nodes represents output of research institutions, and dense degree of line connecting nodes is an essential indicator for closeness between institutions. From lines connecting nodes,

Table 4 Distribution of high output research institutions

No.	Research institutions	Output	Centricity	No.	Research institutions	Output	Centricity
1	University of Pennsylvania	59	0.13	10	University California Los Angeles	27	0.14
2	Northwestern University	43	0.03	11	University British Columbia	26	0.08
3	Duke University	33	0.08	12	University Pittsburgh	26	0.09
4	Columbia University	33	0.12	13	Tilburg University	24	0.14
5	Erasmus University	32	0.14	14	University Chicago	23	0.08
6	University Maryland	32	0.14	15	University Alberta	23	0.17
7	University of Southern California	31	0.15	16	MIT	23	0.01
8	University Texas Austin	28	0.07	17	University Toronto	23	0.11
9	NYU	28	0.09	18	University Florida	23	0.07

4.2 Evolution and mutation of research hot spots Scientific literature is direct carrier of recording knowledge and disseminating knowledge, and key words come from literature and are highly

2013. On the whole, the citation frequency of all top 4 periodicals takes on rising trend, showing constant increase in concern and citation of top 4 periodicals.

we can see that research institutions in the central position are closely connected with other institutions, and the cooperation is relatively frequent, taking on diversified cooperative network. Comparatively speaking, research institutions in edges have single cooperative objects and the cooperation closeness is not high. To further know output situation of research institutions, we arranged research institutions ranking in front position of top 4 marketing periodicals in recent 5 years in Table 4. From Table 4, as source place of the Marketing discipline, University of Pennsylvania and Northwestern University have traditional research foundation and their output level ranks the first and second place separately. With the support of the Ford Foundation, Columbia University has equal research strength with Duke University. They tied for the third place. Research institutions are mainly higher education colleges and universities. As to the location of research institutions, American institutions account for the largest proportion. Besides, quantitative level of output of research institutions can be manifested visually in Fig. 1. Institutions with powerful strength are prominent in the figure and take up important network position. Other countries and institutions cluster around powerful countries and institutions to seek their development and progress.

concentrated products of literature content. In scientific metrology, scholars often study hot spots and development trend through key words. However, this method has the defect of segmentation of

structure, it fails to form network and fails to visually reflect complete knowledge sharing and diffusion network. In view of this problem, we studies research hot spots and visual network analysis of evolution trend of top 4 marketing periodicals in recent 5 years using highly frequent key words, and explored diffusion process of new frontier through hot spot key words.

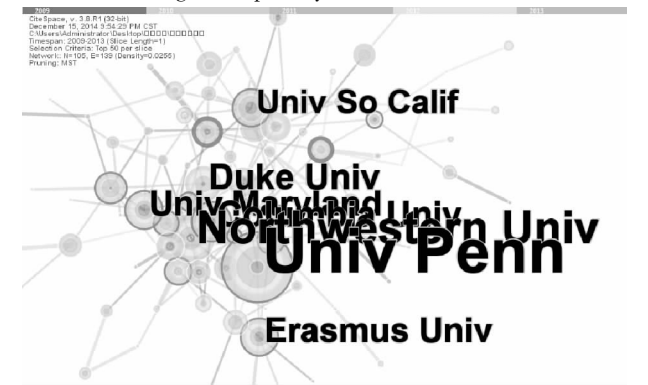


Fig.1 Mapping Knowledge Domains of institutional cooperative network

Table 5 Highly frequently key words

No.	Key words	Frequency	Centricity	No.	Key words	Frequency	Centricity
1	behavior	193	0.21	15	uncertainty	49	0.05
2	information	157	0.17	16	persuasion	48	0.17
3	model	132	0.07	17	quality	47	0.04
4	choice	119	0.08	18	self	45	0.08
5	performance	100	0.06	19	judgments	45	0.09
6	competition	88	0.03	20	Consumer choice	45	0.05
7	impact	86	0.08	21	products	44	0.07
8	consumption	75	0.02	22	strategies	44	0.02
9	sales	64	0.06	23	innovation	43	0.02
10	Decision-making	58	0.06	24	satisfaction	43	0.07
11	Word-of-mouth	54	0.02	25	perspective	41	0.05
12	market	51	0.03	26	demand	40	0.02
13	advertising	50	0.06	27	decisions	40	0.08
14	product	50	0.13	28	internet	40	0.04

hot spots of yesterday may become ordinary issue of today. Therefore, research hot spots are not changing. With elapse of time, research hot spots will also take on evolution and development trend. To further understand development track and evolution trend, we used Citespace software to analyze evolution trend, as shown in Fig. 2. From Fig. 2, we can see that overall researches are relatively concentrated in 2009 – 2013, but different zones have different research hot spots. In 2009 and 2010, researches were focused on behavior, information, models, and products; in 2011, consumer choice and judgments become hot spots; in 2012, hot spots shifted to preference and perceptions; in 2013, researches were concentrated on identity. These indicate that with elapse of time, research hot spots are constantly evolving and changing, and some new topics are gradually becoming main hot spots and gradually mature.

Highly frequent key words reflect frontier hot spots of scholars^[15]. According to appearance times of key words, we listed those key words appearing more than 40 times in Table 5. From Table 5, we can see that behavior, information, model, choice, performance, and competition are research hot spots of Marketing Discipline. The key word "behavior" appears most frequently, its appearance frequency accounts for 13. 6% of all literature. Namely, it appears more than 13.6 times in 100 papers. It can be imagined that behavior research is dominant in the Marketing Discipline. The second highly frequent key word is "information". Information is an essential factor for market economic activity. Information asymmetry directly influences position of individual in economic behavior and an important factor for market regulation. The third highly frequent key word is "model", because marketing field involves marketing object, marketing entity, marketing strategy, and marketing channel, and their interaction mechanism and acting principle are manifested to readers through models.

Research hot spots are objects widely concerned by researchers. When scholars cast excessive eyes on the same issue, it will inevitably lead to excessive research of hot spots. In other words,



Fig.2 Mapping for evolution trend of research hot spots

With change of global economic pattern, Marketing Discipline has experienced several times of transformation, such as change of knowledge localization to knowledge internationaliza-

tion, change of internal absorption of knowledge to omni-directional innovation, and conventional expression to normative scientific terminologies. Transformation of Marketing Discipline will inevitably affect certain mutation of hot spot researches, which also indicates constant exploration and deepening of new research issues. With the aid of mutation identification function of Citespace, it is able to detect mutation of terminologies in certain period (as listed in Table 6), and words with mutation point new direction of exploration and research^[16]. From Table 6, shareholder value, equity, price discrimination, game theory, returns, oligopoly and

Table 6 Analysis of mutation words

No.	Mutation words	Appearance times	Year	No.	Mutation words	Appearance times	Year
1	shareholder value	5.95	2009	11	returns	2.43	2009
2	customer satisfaction	5.03	2009	12	determinants	2.40	2010
3	equity	4.06	2009	13	oligopoly	2.36	2009
4	auctions	4.06	2010	14	monopoly	2.30	2009
5	others	3.13	2011	15	organizations	2.24	2010
6	industry	2.95	2010	16	channel	2.23	2010
7	price discrimination	2.64	2009	17	Bayesian estimation	2.22	2011
8	game theory	2.56	2009	18	emotion	2.21	2012
9	perceptions	2.56	2012	19	research and development	1.97	2009
10	price promotions	2.51	2010	20	dynamic programming	1.95	2009

5.3 Analysis of literature co-citationAmerican scientist Small of Scientometrics and the former Soviet Union scientist Irina Marshakova proposed taking co-citation analysis of literature as new approach for mutual relation of literature^[19]. Once proposed, this approach attracted concern of many scholars. Literature co-citation can be applied in information retrieval, and can set up cluster document and core literature in certain field, to explore evolution and penetration mechanism of the discipline theories.

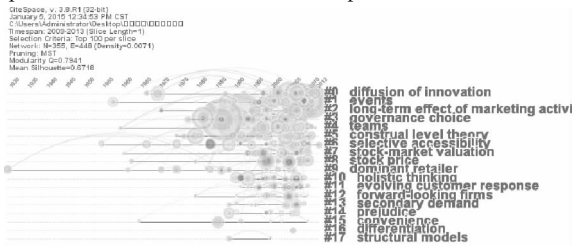


Fig. 3 Time view for cluster analysis of literature

Fig. 3 reflects spectrum analysis of literature in top 4 marketing periodicals and manifests stepwise evolution between frontier research and knowledge foundation^[20]. It reflects 18 clusters and the development of each of the cluster depends on research evolution of literature in related field. From Fig. 3, it can be seen that cluster 9 "dominant retailer" was studied from as early as 1929 by Hotelling. The Hotelling model^[21] proposed by him was famous in development history of competition theor and launched the beginning of competition space and thus has significance of considerable development^[22]. Lu Taihong (2008) pointed out that early stage marketing belongs to transaction marketing stage (1950s), consumers remain not in active position, but passively accept supplied

monopoly are research hot spots of economics. Philip Kotler once said that Economics is the father of Marketing^[17]. Besides, Robert Bartels considered that compared with other social sciences, marketing management organized by individuals and marketing from the perspective of economics are closely connected with theories of economics. Marketing Discipline, as a branch of economics, cites and draws reference from many theories and concepts of economics. Therefore, new hot spots of marketing change from research of traditional consumer behavior to research of fields related to economics^[18].

products, exchange and interaction between enterprises and consumers are single and just feed back demands of customers through simple market survey. Later, marketing activities entered the relationship marketing (1980s), customers gradually got the voice. To build long-term relationship, enterprises actively satisfy demands of customers and set up customer loyalty from the perspective of keeping consumers. Till the times of cooperative marketing after 2000, this means enterprises actively interact with customers, participate in value determination jointly, while the market is only a platform for both parties creating experience and value^[23]. With transformation of marketing stages, consumers are gradually changing from acceptors of retailer supply behavior to leaders of transaction parties, and finally participate in value creation process of enterprise with awareness of being the master.



Fig. 4 View for highly co-cited literature

We made co-citation analysis for all literature downloaded (as shown in Fig. 4). In the figure, literature highlighted with high frequency is core literature. According to literature concen-

tration trend, we divided research methods of such core literature into model basis and marketing application. We selected top 10 core papers with highest frequency of citation and listed them in Table 7. Such core papers play an inestimable role in frontier evolution and theoretical foundation laying for Marketing Discipline. Professors Aiken and West from Arizona State University published the paper titled "Multiple regression: testing and interpreting interactions", which was cited for more than 85 times and played a profound influence on development of statistical analysis. Two papers issued by associate Professor Preacher from famous Vanderbilt University were frequently cited.

From Table 7, papers involving modes and methods accounted for a large portion, reflecting basic and important role of models and methods in research of Marketing Discipline. In 1981, Claes Fornell and David F. Larcker firstly evaluated structural equation modeling (SEM) on the basis of unobservable variables and measurement error. They pointed out drawback of general Chi-square test. Even there are a lot of samples, it is unable to avoid these problems, and present test methods can not make powerful explanation. To solve the above difficulties, they built a sharing variance test system based on structural model, measurement

model, and whole set models^[24]. Papers of Aiken L. S. and West S. G. about multiple regression are classical and have reference significance for subsequent regression statistics. The rest five papers about methods and models studied relationship and difference between mediating variables and moderating variables. Baron and Kenny (1986) firstly proposed moderating variable as an issue of research method and distinguished with mediating variables^[25]. Later, some scholars studied acting principle and interaction mechanism of mediation and moderation, and when variables are called mediating variables and when variables are called moderating variables.

Literature of marketing application mainly focuses on researches on consumers, brands, and reputation. For example, Belk R. W believed that extended self consists of the self plus possessions. The extended self construct builds upon the idea that consumers prefer products that are "congruent" with their selves. Some possessions are not only external manifestation of self, but also organic component of self identity^[26]. Other two papers are studies about online reputation, reflecting that reputation of customers has significant influence on purchase behavior of customers and excellent reputation promotes marketing.

Table 7 Lists of highly co-cited papers

Type	Authors	Name of paper	Periodical	Frequency	Year
Methods and models	Claes Fornell , David F. Larcker	Evaluating structural equation models with unobservable variables and measurement error	Journal of Marketing Research	42	1981
	Baron, R. M. , & Kenny, D. A.	The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations	Journal of Personality and Social Psychology	74	1986
	Aiken, L. S. , &West, S. G.	Multiple regression: Testing and interpreting interactions	(book)	85	1991
	Muller, D. , Judd, C. M. &Yzerbyt, V. Y.	When Moderation is Meditated and When Mediation is Moderated	Journal of Personality and Social Psychology	39	2005
	Preacher, K. J. , Rucker, D. D. , & Hayes, A. F.	Addressing moderated mediation hypotheses: Theory, methods, and prescriptions	Multivariate Behavioral Research	39	2007
	Preacher KJ, &Hayes AF	Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models.	Behavior research methods	60	2008
	Xinshu Zhao John G. Lynch Qimei Chen	Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis	Journal of Consumer Research	60	2010
Marketing Applications	Belk R. W	Possessions and the extended self	Journal of Consumer Research	39	1988
	Godes D, Mayzlin D.	Using online conversations to study word-of-mouth communication	Marketing Science	45	2004
	Chevalier J. A, D. Mayzlin	The effect of word of mouth on sales ;online book reviews	Journal of Marketing Research	42	2006

5 Conclusions

The Marketing Discipline is separated from economics. With more than a hundred years of development and evolution, its growth is inseparable from foundation of theories of economics and management science, and is closely connected with prosperity of market. With deepening of Marketing researches, periodicals of Marketing are also steady on the increase. In this study, we made a scientific metrological analysis of top 4 marketing periodicals (Journal of Marketing Research, Journal of Marketing, Journal of Consumer

Research and Marketing Science.

Through analysis, we found that there are changes in number of papers published in top 4 periodicals in five years; the number of papers published in JM is the lowest, but we can not simply deem that its influence is lower than other three periodicals because its annual frequency of citation is the highest. Scholars prefer to publish papers in high level authoritative periodicals, because those periodicals reflect their academic ability and level more fully. Through analysis of core authors and cooperative institutions, we found that univerrsity of Pennsylvania has the highest

output, but Professor Kumar Vineet from Harvard University Business School published the papers with the highest number. Combining these situations, it can be known that the United States has powerful strength in marketing field. As to new trend of international cooperation, the cooperative network between the United States and other countries will be closer and exchange between institutions will be more frequent.

In addition, visual analysis of mapping knowledge domain indicates that hot spots of marketing are concentrated on high frequency key words, such as behavior, information, model, choice, performance, and competition. Also, through visual evolution analysis of research hot spots, it is able to clearly observe evolution path of hot spots, hot spots of certain period may change with deepening of researches, information to be explored is gradually reducing, thus scholars may turn to other unknown fields. During evolution, hot spots may experience mutation. Once there is mutation, it means there will be new discipline, and mutation words probably become direction of future research development. Apart from key words and mutation words, core papers play a decisive role in research history of Marketing Discipline. They lead the direction of Marketing Discipline and promote development of Marketing Discipline. Through analysis of core papers, we found that they can be divided into method model and marketing application as per research contents, and researches on method models take up a larger portion.

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