Association for Information Systems
AIS Electronic Library (AISeL)

WHICEB 2015 Proceedings

Wuhan International Conference on e-Business

Summer 6-19-2015

Hotel Revenue Management Performance Influencing Mechanism: Theoretical Framework and Research Propositions

Mu-chun LI
School of Economics and Commerce, South China University of Technology, Guangzhou 510006, China, limch@scut.edu.cn

Su-yun MA
School of Economics and Commerce, South China University of Technology, Guangzhou 510006, China

Follow this and additional works at: http://aisel.aisnet.org/whiceb2015

Recommended Citation

Hotel Revenue Management Performance Influencing Mechanism: Theoretical Framework and Research Propositions

LI Mu-chun[1]*, MA Su-yun[2]

[1,2] School of Economics and Commerce, South China University of Technology, Guangzhou 510006, China

Abstract: Revenue management, a management concept which was first used in the US airline industry and has been widely used in other service industries especially hotel industry because of the significant effect. Especially in recent years, revenue management has become an important competition strategy in the hotel. But so far, academic research about hotel revenue management influence mechanism and performance evaluation is still extremely limited. Based on the "influencing factors-decision behavior-performance evaluation" logical relationship, combing through the literature review, this paper discussed the relationship between revenue management influence factors and the performance evaluation, proposed the theory framework concerning influence mechanism of hotel revenue management performance evaluation and research propositions.

Keywords: hotel; revenue management; performance evaluation; influencing mechanism; framework

1. INTRODUCTION

Revenue management (RM), also called yield management (YM), was first used in the US airline industry and has been widely used in other service industries, especially hotel industry. Because of the significant effect, the industries which had adopted RM include rail, car rental, dining, golf , cruise, internet, hospitals and health care centers, gaming, resorts and theme parks and so on[1,2]. Entered in twenty-first Century, RM has become an essential technology tool for lodging industry. Today, application of RM in the international hotel industry has gradually turned from tactical to strategic[3].

In the hotel industry, Marriott Corporation is the first practitioner to implement RM system. According to relevant data, Marriott Hotel Group achieved a huge success through the use of RM technology in 1991. In the practical application field, Guangzhou White Swan Hotel purchased the RM system in 2002 and became one of the earliest Chinese hotels which introduced RM. With respect to the rapid development of RM in the international hotel industry, either practice or research domestic in Chinese is relatively much more fall behind. In addition, the growing, even intense competition in Chinese hotel industry has been an indisputable fact nowadays. In this context, the development of RM in Chinese lodging industry needs focus and guidance of theoretical research. However, the related researches are relatively scarce. This status of research can't provide a beneficial effect on the development of RM practice in Chinese lodging industry. Based on fully retrieving the relevant research literature nearly the last three decades, this paper follows the "influencing factors-decision behavior-performance evaluation" logical relationship, discusses the relationship between RM influence factors and the performance evaluation, proposed the theory framework and research propositions. This study enriches the theoretical research of domestic hotel RM on the one hand, on the other hand has a certain reference value to the practice of Chinese lodging industry.

---

* Corresponding author. Email: limch@scut.edu.cn

2. LITERATURE REVIEW

2.1 Hotel RM concept

The earliest concept of RM is from Littlewood (1972) [4]: Airline revenue management is selling the appropriate seat to appropriate passengers at the right time. Till now, RM has extended to a lot of industries, turned from a tool depended on complicated computer information technology into a macro strategic guidance idea, from focusing on macroscopic strategy to the specific decision execution.Lodging industry is one of the main industries using RM concepts and techniques widely after airline industry. The concepts over the years are integrated in table 1. Integration the RM concept evolution process, in this paper, hotel RM is to maximize revenue for overall goals, with overall development strategy, relying on the complicated IT technology, at the right time for the right price, selling appropriate products and services to appropriate guests through the proper channels. The core RM elements adds sales channels combination to product, price, time and market.

Tab. 1　　Revenue management concept evolvement

1988	Sieburgh first proposed the concept of hotel RM, which is a series of procedures to control the prices and rents[5].
1989	Kimes put forward RM definition which is widly quoted in the academic circle and four core elements[6].
1992	Jones and Hamilton proposed hotel RM was a system, including a series of systems and procedures to make hotel profit maximize, affirmed the RM system attributes, and emphasized the strategic role of RM[7].
1994	Paul Davies criticized the RM, thought the RM is a means of unfair competition, causing price unfair problems[8].
1995	Jauncey S et al. concluded hotel RM was a method to maximize hotel revenue, a systematic, continuous, integrated method, and had been gradually involved in other departments except rooms[9].
1997	Cross defined the RM as a rigorous tactical application, predicting the consumer behavior in micro market level to maximize the availability and unit price of products, consequently maximize revenue[10].
1999	Baker and Collier put forward the short-term attribute of hotel RM[11].

2.2 The influencing factors of hotel RM performance

Existing research shows the influencing factors of hotel RM performance are diverse and can be divided into external factors and internal factors. The external factors mainly refer to the economic environment which could strongly influence the consumer purchasing power and spending patterns, consequently influence hotel's survival and development. Enz, et al. (2001) found that hotel performance is closed to the economic environment for that period of time[12]. Generally speaking, the external factors also involves many aspects of national politics, culture, society, technology, competition, environment etc. And the internal factors includes the influencing factors and behavioral factors[13], behavioral factors includes technical and organizational factors[14].

Queenan et al.(2011) explored the influencing factors on the hotel RM performance from two aspects of technology and social driven, focusing on RM behavior effect on RM performance[14]. The empirical research of Upchurch, et al.,(2002) came to conclusion that demand forecasting, reservation systems, overbooking model and policy, performance evaluation, income data statistics were important factors related to RM behavior[15]. Griffin (1996) listed four basic factors of RM success: market segmentation, demand forecasting, inventory management and performance evaluation[16]. While these studies related to RM behavior factors, but unfortunately did not carry on the discussion of the relationship between hotel physical characteristics and RM performance. The empirical study of Wang Xiaowen (2013) researched the Chinese high Stars Hotel RM performance driving factors, but the study only discussed the factors of hotel physical features, ignoring the effect between RM behavior and performance. At the same time, RM performance measurement mainly based on subjective perception, which made the conclusion less convincing. In follow-up studies,Tian Xin, Wang Xiaowen (2014) investigated the key drivers of hotel RM strategy according to researching the hotel management company attributes, technical and social driving factors three aspects of influence on the RM performance[17]. The relationship among all the influencing factors is showed in Figure 1.

2.3 Hotel RM performance evaluation

In the aviation industry, the earliest and most mature of RM application, RM performance evaluation indexes are income created by each seat per km or mile, also referred to Revenue/ASK or Revenue/ASM. Subsequently, RM was introduced into the lodging industry, RM performance evaluation is which has been created for each guest room everyday income, namely RevPAR. For most hotels, RevPAR is used as optimal evaluation criteria of hotel interior RM performance. However, when we evaluate RM implementation and effectiveness of a hotel with the other competitors in a certain competitive environment, RevPAR obviously cannot meet the requireme-
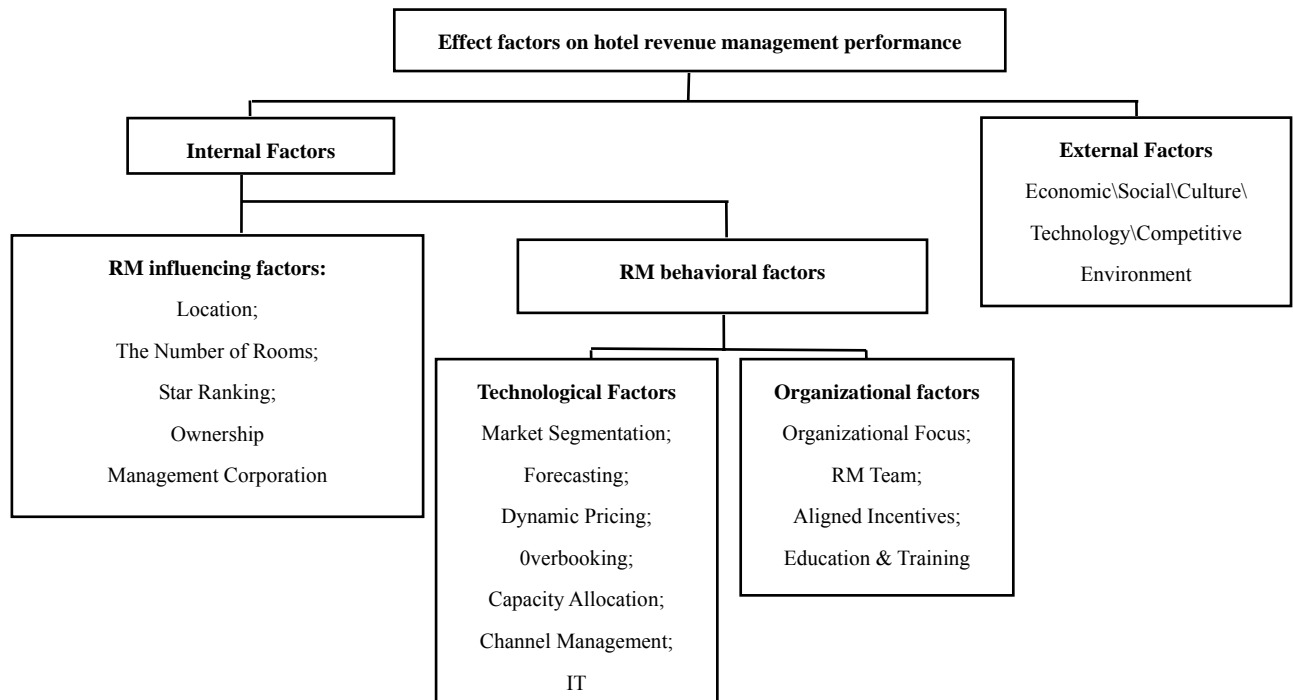

Fig. 1 Effect factors on Hotel RM Performance

-nt, so Cross et al.,(2009) put forward a more accurate assessment "income create index (RGI)"[3].

But the Chinese scholar Huang Yinghua (2005)[18], Zhang Yan (2007)[19],Chen Xu (2003)[20] argued that if in the same market environment, a large hotel relatively had a disadvantage in the calculation of RevPAR, especially the conference hotel. In addition, some scholars considered that RM produced price unfairness for the dynamic pricing in the view of customer perception, this problem will reduce customer satisfaction, thereby affect the long-term RM performance[21,22]. Therefore, this paper argues that hotel RM performance evaluation should consider both comprehensive financial index and perception index. The financial index should combine RevPAR and RGI index to reflect the contribution of RM more accurately in the same competition environment, and quantitative research on customer satisfaction can really reflect the long-term performance of hotel RM.

3.   HOTEL RM PERFORMANCE EFFECT MECHANISM RESEARCH

3.1 The Establishment of Theoretical Framework

According to social technical system theory, hotel is a social technical system by the interaction between social and technical system, hotel management emphasizes on the optimal combination of technology and human factors. In the process of RM, the social technical system theory emphasizes technology and human group interaction. Compared with airline industry, lodging industry structure is more dispersed, RM implementation and operation of Hotel Group subsidiary is relatively independent, which ensure that the sample is desirable and effective, but bring more challenges for RM implementation. RM implementation in internal hotel needs more balance between technology and social factors[23].Integrated the related researches mentioned

in chapter 2, the hotel RM performance influencing mechanism model is proposed as shown in figure 2.

3.2 Propose research proposition

3.2.1 Hotel RM influencing factors affect on hotel RM behavior and performance

The influencing factors of hotel RM refer to a series of hotel features influencing hotel whether to use RM, usually are the representation characteristic of hotel itself , physical attributes etc., which has stability attribute and can affect hotel RM practice but can not in return. Many scholars have stressed the importance of hotel physical attributes, which play an important role on changing room price, including hotel size, facilities and so on[24,25,26] . For example, room distribution is one of the main contents of hotel RM decision. The more rooms,
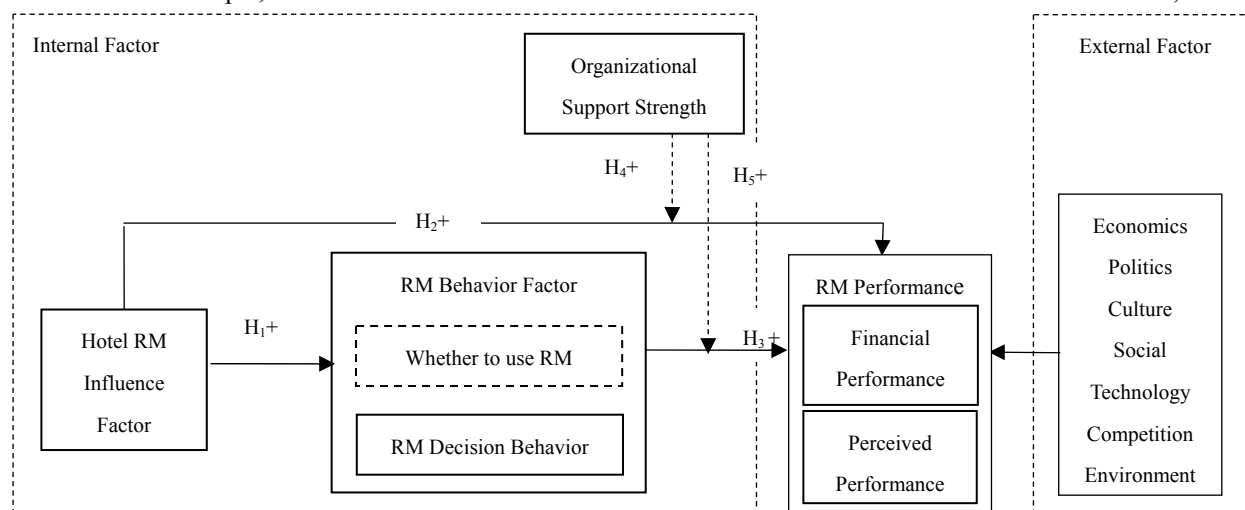

Fig. 2 Hotel RM performance and influencing factor mechanism

Annotation：　——————▶ Main effect　----------▶ Regulating effect

the more types, the more important to use RM decision to assign rooms. The empirical research of Wang Xiaowen (2013) supported it[13].

Except room situation, location also has a positive impact on the price[25]. The superior location and accessibility is usually with higher price. Taking the urbanization into account, the hotels which located in the central business district would have higher price[27]. At the same time, relative to the low Star Hotels, high Star Hotels tend to introduce advanced management method, simultaneously have better resource condition to introduce RM system. The existing researches show that the influencing factors on hotel RM practice are related to location, number of rooms, star rating factors and so on [15,28].

At the same time, based on the Principal-Agent Theory, the different background of hotel management company would also affect RM behavior. The existing research shows the hotel which included international hotel management background would be more easily to introduce RM system because of the skilled technology and smooth implementation, RM performance would also be higher. Relatively, the state-owned, private and single property hotels would encounter more difficulties in the process of RM implementation[13]. Generally speaking, in China, the hotel owner types mainly include foreign investment, state-owned, private and individual. Types of owners and hotel management company background would mutual influence closely[29], the impact on hotel RM behavior and performance is relatively consistent.

Not all hotels which adopt RM would gain good performance, and how to evaluate hotel RM performance has always been a core problem. From the existing literature review, hotel physical characters not only affect RM behavior, but also affect RM performance [14,15,28]. Abrate G et al., (2012) proved that location, star grade, room number were not only the important factors affecting the average price, but also influencing RM performance[27]. Ricardo Oliveira et al. (2013)[30] and Wang Xiaowen (2013)[13] also showed the management company type, owners and star grade would influence whether to adopt RM, RM implementation and performance. To sum up,

this paper put forward the following hypothesis:

H_{1a}: Rooms number has positive effect on hotel RM practice. Hotel would tend to use RM with more rooms.

H_{1b}: Location positively affect on hotel RM practice. Hotel would tend to use RM with superior location.

H_{1c}: Star grade positively affect on hotel RM practice Hotel would tend to use RM with higher star grade.

H_{1d}: Hospitality management company types positively affect on hotel RM practice. Hotel would tend to use RM with the higher foreign component.

H_{1e}: Owners type positively affect on hotel RM practice. Hotel would tend to use RM with more foreign component.

H_2: Hotel properties physical characters positively affect on hotel RM performance. Hotel would tend to achieve better performance with more rooms, superior location, higher star grade and higher foreign component of owners and management companies.

3.2.2 RM behavior factors affect on hotel performance

In the lodging industry, market segmentation divided customers into different groups based on the observation, conjecture or the difference of characteristics, behavior patterns and consumer preference. Tim Coleman (2000) further points out that market segmentation is the premise to sell appropriate products and services aimed at the proper market[31]. Therefore, market segmentation is the basis of RM decision behavior.

In addition, forecasting demand with proper methods and tools accurately is a must for successful RM application., Mc Gill&Van Ryzin(1999) agreed it[32]. At present, a considerable number of studies have focused on this two aspects: demand prediction and forecasts for RM index and operation data[33]. What the important to note is that RM can not only predict the hotel's own but also the opponents' in the same competitive environment. The predicted results would affect their decision-making behavior in turn. There are studies that prediction for competitors would bring negative influence to the hotel itself, as Yüksel (2007) proposed[34].

Dynamic pricing and room assignment are the other two very important tools in the RM application process. Dynamic pricing refers to a kind of business strategy, the price varies according to the different channels, products, customers and time[22]. To some extent, hotel RM means utilizing different customer perception to product and service to differ prices[35]. Dynamic pricing is the most mature field of RM, to maximize revenue and profit through different price strategy according to different customer groups. Price is the most effective tool to regulate demand and dynamic pricing is the key factor affecting the performance [36]. Room allocation refers to assign rooms based on the accurate demand prediction, pursuing profit maximization, effectively using space to control room capacity, to accept or reject group booking, according to the different market segments, product features and sales channels[37].

In the hotel industry, overbooking refers to the strategy that sells more rooms than the total available reservations in order to make up the foreseeable loss. In order to reduce the risk of overbooking, overbooking model is essential to be established. Paul Davies (1994) concluded the theoretically optimal overbooking point is when the marginal revenue is equal to the marginal cost of additional reservation[8]. But in fact, reservation quota was dynamic and adjusted according to the change of the actual subscription data[38]. Although the overbooking could improve the occupancy rate and increase the profits, Wang Banghua (2012) showed that overbooking caused significant negative impact on customer satisfaction which is related long-term revenue[39].

Reasonable sales channels are also the important work of RM decision making and related to other core elements. Although the organization structure of Hotel middlemen affected ADR, RevPAR and the whole RM system, the channel management did not attract a lot of attention, only a small number of scholars studied marketing channel from the RM perspective[33]. Myung, Li and Bai (2009) found that although there were conflicts between various sales channels, the hotel performance is satisfactory[40]. But Choi and Kimes (2002) concluded that application of RM strategy in distribution channel was not very helpful to the hotel[41].

In the surroundings of big data age, IT system has become an indispensable core competitiveness of enterprises. IT system is necessary to RM, including RM software, hardware and related technical personnel. If there is no IT systems, processing of large database can't be realized[42]. RM software can provide the relevant advice of pricing, inventory control and channel management, help revenue manager analysis data and accurately predict demand based on embedded optimization model[33]. IT system plays an important role in the implementation of demand forecasting, inventory management, channel combination, price strategy formulation and a series of RM decision behavior. To sum up, this paper put forward the following hypothesis:

H_{3a}: Market segmentation positively affect on hotel RM performance.

H_{3b}: Demand forecasting positively affect on hotel RM performance.

H_{3c}: Dynamic pricing positively affect on hotel RM performance.

H_{3d}: Room allocation positively affect on hotel RM performance.

H_{3e}: Overbooking positively affect on hotel RM performance.

H_{3f}: Sales channel combination positively affect on hotel RM performance.

H_{3g}: IT system positively affect on hotel RM performance.

3.2.3 Regulating Effect of Organizational Support Strength

Organizational support refers to the various efforts, including administrative support, organizational commitment and the organizational structure effectiveness in order to help RM implement smoothly. Provided of organizational commitment and resources is considered to be the key success factors for RM[14]. The organizational structure effectiveness namely organized hierarchy and decision making and information transmission which are beneficial to RM. The higher is organizational support strength, the funds is more abundant, organization structure is more reasonable, RM would be more effective. Van de Ven (1976), Dalton et al, (1980）, Galbraith and Lawler, (1998) all supported organizational support influencing RM performance. Queenan et al., (2011) also demonstrated this point[14]. Thus, this paper argues that the organizational support strength impacting on hotel RM performance includes four dimensions: organizational focus, RM Team, aligned incentives and education & training. This paper believes that the organizational support strength would adjust the relationship among hotel facility character, RM behavior and RM performance. To sum up, this paper put forward the following hypothesis:

H_4: Organizational support strength has a positive moderating effect between hotel facility character and RM performance. The positive influence of facility characters on RM performance is more significant with higher organizational support.

H_5: Organizational support strength has a positive moderating effect between RM behavior and performance. RM behavior's positive influence on RM performance is more significant with higher organizational support.

4. CONCLUSIONS AND DISCUSSION

4.1 Conclusion

Based on the literature review and the logic relationship of "influencing factors----decision behavior----Performance Evaluation", this paper discussed the relationship between revenue management influence factors and the performance evaluation, proposed the theory framework and research propositions. In this theory framework, there are three important explanatory variables effect on RM performance: facility character, RM behavior and organizational support. This paper also pointed out the three explanatory variables mutual action mechanism which are maybe existed. In addition, this paper puts forward two dimensions of hotel RM performance evaluation: perceiving and financial.The innovation of this paper contributes in two aspects. Firstly, this paper systematically reviews the related research literature, deepen the understanding of influencing factors action mechanism and relationships. Secondly, this paper presented a discussion model, concerning hotel

RM performance evaluation influence mechanism, improve theoretical discussion and empirical studies direction for the future and enrich related research field, especially for Chinese lodging industry.

4.2 Discussion

Nevertheless, this study proposed the theoretical framework and research propositions, there still exist some limitations, such as no further data collection for the empirical test. Specifically, the future research will be focused on the following aspects: firstly, whether the model is valid or not needs to be further verified. Especially the organizational support strength moderating affection. Secondly, how to control the external influence factors as much as possible to exclude the economical, social, environmental effect. Thirdly, as far as possible to reduce the limitations of single performance measure index is very important. Therefore, in the future research, the author would use empirical research to verify and revise the model, using RGI as the performance indicators, as far as possible to control the external factors influence to reduce the error of data measured in different District.

ACKNOWLEDGEMENT

REFERENCES

[1] Mei H, Zhan Z. An analysis of customer room choice model and revenue management practices in the hotel industry[J]. International Journal of Hospitality Management, 2013, 33: 178-183.

[2] Heo C Y, Lee S. Application of revenue management practices to the theme park industry[J]. International journal of hospitality management, 2009, 28(3): 446-453.

[3] Cross, R., Higbie, J. & Cross, D. Revenue management's renaissance: a rebirth of the art and science of profi- table revenue generation[J]. Cornell Hospitality Quarterly, 2009,50(1), 56-81.

[4] Littlewood K. Forecasting and Control of Passenger Bookings[A]. In: *Proceedings of the 12th Annual AGIFO RS Symposium*[C]，New York，1972: 95-117。

[5] Sieburgh J A. Yield management at work at Royal Sonesta[J]. Lodging Hospitality, 1988, 44(11): 235-237.

[6] Kimes,S.E.The basics of yield management[J]. The Cornell Hotel and Restaurant Administration Quarterly, 1989,30(3).

[7] Jones, P. and Hamilton, D. Yield management: putting people in the big picture[J]. The Cornell Hotel and Restaurant Administration Quarterly, 1992,33(1): 89-96.

[8] Paul Davis.Collective Responsibility and the Subjective Standpoint.1994,Cogito 8 (2):155-158.

[9] Jauncey S, Mitchell I, Slamet P. The meaning and management of yield in hotels[J]. International Journal of Contemporary Hospi-tality Management, 1995, 7 (4): 23)26

[10] Cross, R.G. Launching the Revenue Rocket: How Revenue Management Can Work for Your Business[J]. The Cornell Hotel and Restaurant Administration Quarterly, 1997,38(2): 32-43.

[11] Baker T K, Collier D A. A comparative revenue analysis of hotel yield management heuristics[J]. Decision Sciences, 1999, 30(1): 239-263.

[12] Enz C A, Canina L, Walsh K. Hotel-industry averages: an inaccurate tool for measuring performance[J]. The Cornell Hotel and Restaurant Administration Quarterly, 2001, 42(6): 22-32.

[13] Wang Xiaowen, Tian Xin, Li Kai, Hu Zhijian. Research on factors influencing hotel revenue management decision-making and performance: An empirical study based on high star-rated hotels in China[J].Tourism Tribune,2013,28(9): 25-33.

[14] Queenan C C, Ferguson M E, Stratman J K. Revenue management performance drivers: An exploratory analysis within

the hotel industry[J]. Journal of Revenue & Pricing Management, 2011, 10(2): 172-188.

[15] Upchurch R S,Ellis T,Seo J.Revenue management underpinnings: An exploratory review[J]．International Journal of Hospitality Management，2002，21(1): 67 －83．

[16] Griffin R K. Factors of successful lodging yield management systems[J]. Hospitality Research Journal, 1996, 19(4).

[17] Tian Xin, Wang Xiaowen, Li Kai, Chen Jie. The Driving Factors of Hotel Revenue Management Strategy:An Empirical Study Based on Chinese Starred-Hotel Data[J]. Tourism Science, 2014,28(4):65-80.

[18] Huang Yinghua．On the research analysis of revenue management approaches in hospitality industry [J]．Tourism Tribune，2005，20(5) : 50 － 54．

[19] Zhang Yan．Theoretical study on the price-fixing methods of guestrooms in hotels[J]．Tourism Tribune，2007，22(3).

[20] Chen Xu．Hotel revenue management: Research overview and prospects ［J］．Journal of Management Sciences in China，2003，6(6) : 72 － 78．

[21] Sunmee, C. and Mattila, A.S. Impact of Information on Customer Fairness Perceptions of Hotel Revenue Management[J]. The Cornell Hotel and Restaurant Administration Quarterly, 2005, 46(4): 444-451.

[22] El Haddad R, Roper A, Jones P. The impact of revenue management decisions on customers attitudes and behaviours: A case study of a leading UK budget hotel chain[C]//EuroCHRIE 2008 Congress, Emirates Hotel School, Dubai, UAE, 11th-14th October. Retrieved April. 2008, 6: 2011.

[23] Brotherton B, Turner R. Introducing yield management systems in hotels: getting the technical/human balance right[J]. Journal of Services Research, 2001, 1(2): 25-48.

[24] Roubi S, Litteljohn D. What makes hotel values in the UK? A hedonic valuation model[J]. International Journal of Contemporary Hospitality Management, 2004, 16(3): 175-181.

[25] White P J, Mulligan G F. Hedonic estimates of lodging rates in the four corners region[J]. The Professional Geographer, 2002, 54(4): 533-543.

[26] Monty B, Skidmore M. Hedonic pricing and willingness to pay for bed and breakfast amenities in Southeast Wisconsin[J]. Journal of Travel Research, 2003, 42(2): 195-199.

[27] Abrate G, Capriello A, Fraquelli G. When quality signals talk: Evidence from the Turin hotel industry[J]. Tourism Management, 2011, 32(4): 912-921.

[28] Javis N，Lindh A，Jones P．An investigation of the key criteria affecting the adoption of yield management in UK hotels ［J］．Progress in Tourism and Hospitality Research，1998，4 (3): 207 －216．

[29] Zhu Chengqiang，Lyu Lili．Research on relationship between international hotel management groups and Chinese propertyowners under management contract [J]．Tourism Science，2011，25(3) : 67 － 74．

[30] Oliveira R, Pedro M I, Marques R C. Efficiency performance of the Algarve hotels using a revenue function[J]. International Journal of Hospitality Management, 2013, 35: 59-67.

[31] Milla S, Shoemaker S. Three decades of revenue management: what's next?[J]. Journal of Revenue & Pricing Management, 2008, 7(1): 110-114.

[32] McGill, Jeffrey I., and Garrett J. van Ryzin. Revenue management: Research overview and prospects[J]. Transportation Science,1999. 33 (2): 233-56.

[33] Ivanov S, Zhechev V. Hotel revenue management–a critical literature review[J]. Turizam: znanstveno-stručni časopis, 2012, 60(2): 175-197.

[34] Yüksel, S. An integrated forecasting approach to hotel demand[J]. Mathematical and Computer Modelling, 2007,46(7-8), 1063–1070.

[35] Hu Zhijian. Revenue Management: Maximization of Hotel Revenue[M]. Beijing: Tourism Education Press, 2009. 7.

[36] Bitran G, Caldentey R. An overview of pricing models for revenue management[J]. Manufacturing & Service Operations Management, 2003, 5(3): 203-229.

[37] Bernstein, F. and Vulcano, G. Pricing and Revenue Managerment: Present and Trends[J]. Boletin de la Sociedad

Espanola de Estadistica e Investigacion Operativa, 2007, 23 (4): 9-12.

[38] Murtagh B A, Saunders M A, Murray W, et al. GAMS/MINOS: A solver for large-scale nonlinear optimization problems[J]. The documentation is available at http://www. gams. com, 2002.

[39] Wang Banghua. The impact of revenue management practice on customer satisfaction: An empirical research in hotel industry [D]. Qingdao University Tourism Management, 2012.

[40] Myung, E., Li, L. & Bai, B. Managing the distribution channel relationship with e-wholesalers: Hotel operators'perspective[J]. Journal of Hospitality Marketing & Management, 2009,18(8), 811-828.

[41] Choi, S. & Kimes, S.E. Electronic distribution channels'eff ect on hotel revenue management[J]. Cornell Hotel and Restaurant Administration Quarterly,2002,43(3), 23-31.

[42] Guadix J, Cortés P, Onieva L, et al. Technology revenue management system for customer groups in hotels[J]. Journal of Business Research, 2010, 63(5): 519-527.