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## INNOVATIVE MANAGEMENT IN TOURISM INDUSTRY: DATA ENVELOPMENT ANALYSIS

*Travelling abroad has become a trend in recent years. Tourism businesses offer various preparations for going abroad, such as visas, reservations, accommodation and other trip arrangements. After deregulation of traveling in 1988, tourism business in Taiwan has grown rapidly. However, as businesses consider turnover as business performance, malicious price competition at the travel market, low quality, and vicious closure have frequently occurred. At such a competitive travel market, how to enhance tourism quality and profit target with predominant innovative management has become a major issue for a tourism business. Based on the operational information of tourism industry in Taiwan in 2008-2010, data envelopment analysis (DEA) and Malmquist productivity analysis are combined to measure total efficiency (TE), pure technical efficiency (PTE), and scale efficiency (SE) of 10 major tourism and travel agents in Taiwan. The research results would be the reference of innovative management efficiency improvement in tourism.*

*Keywords:* tourism; data envelopment analysis; innovative management.

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## ІННОВАЦІЙНИЙ МЕНЕДЖМЕНТ У СФЕРІ ТУРИЗМУ: АНАЛІЗ СЕРЕДИ ФУНКЦІОНУВАННЯ

*У статті показано, що туристичний бізнес, крім безпосередньо мандрівки, пропонує також такі послуги, як візова підтримка, бронювання житла тощо. Після відміни контролю виїзду за кордон у 1988 р. туристичний бізнес на Тайвані став стрімко розвиватися. Однак, оскільки акцент бізнесмени роблять переважно на прибутку, агресивна цінова конкуренція за низької якості послуг стали постійним явищем. В умовах конкуренції на ринку підвищення якості послуг та посилення позиції інноваційного менеджменту стали ключовими завданнями. Використовуючи звітні дані туристичних фірм Тайваню за 2008-2010 рр., проаналізовано середовище функціонування та аналіз продуктивності за Малмквістом. Проведено оцінювання загальної ефективності, технічної ефективності та ефективності від масштабу для 10 ключових гравців на туристичному ринку Тайваню. За результатами аналізу розроблено рекомендації для турфірми щодо інноваційного менеджменту та підвищення ефективності.*

*Ключові слова:* туризм; аналіз середи функціонування; інноваційний менеджмент.

*Табл. 2. Літ. 19.*

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## ИННОВАЦИОННЫЙ МЕНЕДЖМЕНТ В СФЕРЕ ТУРИЗМА: АНАЛИЗ СРЕДЫ ФУНКЦИОНИРОВАНИЯ

*В статье показано, что туристический бизнес, кроме самого путешествия, предлагает также такие услуги, как визовая поддержка бронирования жилья и т. д. После отмены контроля выезда за рубеж в 1988 г. туристический бизнес на Тайване стал стремительно расти. Однако, поскольку акцент бизнесмены делают преимущественно на прибыли, агрессивная ценовая конкуренция при низком качестве услуг стала частым явлением. В условиях конкуренции на рынке повышение качества услуг и усиление позиции инновационного менеджмента стали ключевыми заданиями. Используя отчетные данные*

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*по деятельности туристических фирм Тайваня за 2008-2010 г.г., проведен анализ среды функционирования и анализ производительности по Малмквисту. Дана оценка общей эффективности, технической эффективности и эффективности от масштаба для 10 ключевых игроков на туристическом рынке Тайваня. По результатам анализа разработаны рекомендации для турфирмы касательно инновационного менеджмента и повышения эффективности.*

*Ключевые слова:* туризм; анализ среды функционирования; инновационный менеджмент.

**I. Introduction.** With the increase of national income and deregulation of overseas travel policy in Taiwan, the demand for overseas tourism has been increasing ever since. Following the elevation of traveling abroad, the domestic travel market has been flourishing and tourism businesses which provide travel services are also increasing rapidly. By 2008, there were up to 2,230 travel agencies, including 92 consolidated travel agencies, 1,989 Class-A travel agencies, and 149 Class-B travel agencies. Under the globalization, tourism is considered as a synthetic and diverse industry, which not only presents the characteristics of sustainable development, but is able to promote other industries so that job opportunities are increased, foreign exchange earnings are enhanced, balance of international payments is leveled, international cultural and economic exchanges are promoted (Ardahaey, 2011). By inspecting the international tourism environment, tourism activities in the world have become popular and grow rapidly. Every country is investing in the development of tourism resources and marketing to attract more tourists and to increase foreign exchange earnings.

Growing competition at the travel market has signaled that most travel agencies are volume driven and thus ignore the role that innovative management plays in leading firms toward competitive edge (Young, Charns, & Shortell, 2001). Mismanagement would result in revocation of license or closure that it would be a loss for both the consumers and the tourism businesses (Briassoulis, 2002). Nonetheless, external monitoring is merely a temporary solution to the issue of quality (Warnken & Buckley 2000). Thus, the sustainable approach is to focus on innovative management in tourism. Successful implementation of innovative management could ensure the capacities of a travel agency in providing quality travel products (Buhalis, 2000). With the discussion on innovative management, this study tends to provide businesses with a referable model for improvement of management so that the quality of the domestic travel market would be promoted as well as the win-win situation could be created for both the consumers and the tourism business.

## **II. Literature review**

**(1) Innovative management.** Betz (1993) regarded invention as a concept formed by innovative products or procedures, and innovation as to introduce a new product, procedure, or service to a market. Thomke (2001) considered experiments as the core of innovation, i.e., an enterprise would create and improve products by systematic tests. Such an enlightened experimentation strongly impacts enterprises with high R&D costs. The rules for enlightened experimentation are (1) to establish an organizational structure for prompt experiments, (2) to have frequent failures at the beginning of an experiment in order to avoid errors, (3) to expect and use well the initial information, and (4) to combine new and old technologies for faster and lower-cost experimental efficiency.

Hung (1999) regarded innovative management as achieving expected objectives through planning, target management, environment evaluation, negotiation, integration, and progress control. In the process of innovative product activities, the related environments were changeable, including the external environment of consumer behaviors, supplier capability, competitor strategies, economic activities at a market, governmental policies, and technology changes, and the internal environment of individual innovation value, creative learning ability of a team, and transdepartmental coordination and integration. In this case, innovative management is managerial activities of innovative individuals, teams, organizations, and external environments. Management in individuals, teams, and organizations is the focus of innovative management as well as the key success factors in innovative management (Scott & Laws, 2006).

Tomala & Senechal (2004) discussed and analyzed various models of innovative management, in which the members participating in innovation, the periphery of an innovative organization, and types of institutions selected for innovative plans were taken into account.

1. Members participating in innovation have external decision-makers, internal decision-makers, management staff, research personnel, development personnel, and experts.

2. Peripheral environment of an innovative organization and the entire work structure, including company, scientific, cooperative, and market operating space.

3. Institutional types could be divided into mix-type with autonomy, system-type with innovation, and bureaucracy-type without autonomy. Nevertheless, there is no ideal type to guarantee the success.

Pels et al. (2003) applied DEA and SFA to evaluate the performance of 34 airports in Europe, where two dimensions were evaluated. First, station services, including number of runways, area of terminal, number of gates, number of employees, number of baggage carousels, and number of parking space, were the input items, while cargo tonnage and number of visitors were the output items. Second, airside operations, such as runway area, number of runways, number of employees, and area of airport were the input items, while number of cargo aircrafts and airliners taking off and landing were the output items. Sarks and Talluri (2004) applied DEA and clustering method to evaluate 44 airports in the USA in 1990-1994, in which operating cost, number of employees, number of gates, and number of runways were the input items, while operating income, number of civil and ordinary aviation taking off and landing, number of visitors, and cargo tonnage were the output items. The evaluation outcomes provided government agencies and airport managers with references on management efficiency improvement. Chiu and Wu (2010) studied 49 international hotels in Taiwan from 2004 till 2006, where number of guest rooms, number of employees, floor area designated to food and beverage were the input items, and income from guest rooms and rentals, food and beverage, service (excluding service charge), and other incomes were the output items. DEA was used to evaluate the attractiveness of the hotels with better relative efficiency and the progress of the hotels with relative poorer efficiency. The DEA model was also able to rank the values of attractiveness and progress.

- (2) Data Envelopment Analysis. Farrell (1957) proposed input orientation and output orientation for efficiency evaluation. With existing outputs, the former applied the minimum inputs to efficiency evaluation. With existing inputs, on the other hand,

the latter compared the efficiency of the decision-making units with maximum outputs. Since the input items of profit-making enterprises are controlled by decision-making units, but the outputs are uncontrollable because of market factors, input orientation is often applied. This study also applied DEA with input orientation to analyze the innovative management performance in tourism. Further discussions and applications of DEA are referred to in Fried et al. (1993) and Cooper et al. (2000).

**III. Research method.** When data envelopment analysis is applied for efficiency evaluation, each input/output item would decrease the discrimination of data envelopment analysis. In this case, 4 inputs and 5 outputs could deduct 20 input/output ratio values. Theoretically, at least more than two DMUs should be analyzed for discrimination. Golany & Roll (1989) proposed the rule for data envelopment analysis that the number of the evaluated decision-making units should be at least two times of the sum of input and output items (Chiang, Tsai & Wang, 2010).

4 output variables and 10 DMUs were selected for this study, this corresponds to the above rule for data envelopment analysis. All the variables used in this study are the public statement of profit and loss, prospectus, and annual reports of the tourism businesses.

Definitions of the variables:

(1) Input variables:

1. Labor costs: Personnel costs of the sum of employees, including management staff, R&D personnel, sales staff, and production staff.

2. Innovative management costs: The invested costs in innovative management.

(2) Output variables:

1. Turnover: The receive revenue in a certain period of time.

2. Number of people: The sum of people joining in the groups in a certain period of time.

#### IV. Empirical analysis

**(1) Relative efficiency analysis.** Table 1 shows the relative efficiency of various tourism businesses. In terms of total efficiency, the average efficiency of 3 years is 0.88, in which Phoenix Tours and Lion Travel present the best performance (0.99), followed by South East Travel (0.98), and Ming Tai the worst (0.75) in 2008; Phoenix Tours and Lion Travel the best (0.98) and Ming Tai the worst (0.72) in 2009; and, South East Travel and Lion Travel the best (0.99), followed by Phoenix Tours (0.97), and Ming Tai the worst (0.73) in 2010. In this case, Lion Travel shows the best performance in 3 years, while Ming Tai shows the worst.

In regard to pure technical efficiency, the average efficiency in 3 years was 0.87, in which South East Travel shows the best performance (0.99), followed by Lion Travel (0.98), and Ming Tai has the worst (0.72) in 2008; South East Travel and Lion Travel are the best (0.99) and Ming Tai is the worst (0.71) in 2009; South East Travel is the best (0.99), followed by Lion Travel (0.98), and Ming Tai has the worst (0.71) in 2010. Apparently, South East Travel demonstrates the best performance in 3 years, while Ming Tai shows the worst.

Regarding scale efficiency, the average efficiency in 3 years was 0.85, in which Lion Travel has the best performance (0.96), followed by South East Travel and Phoenix Tours (0.95), and Ming Tai (0.73) is the worst in 2008; South East Travel is the best (0.95) and Ming Tai - the worst (0.71) in 2009; South East Travel is the best

(0.94), followed by Phoenix Tours (0.93), and Ming Tai (0.72) the worst in 2010. As a result, South East Travel presents the best performance in 3 years, while Ming Tai shows the worst.

**Table 1. Relative efficiency of various tourism businesses**

Travel agency		Total efficiency	Pure technical efficiency	Scale efficiency
South East Travel	Average in 2008	0.98	0.99	0.95
	Average in 2009	0.97	0.99	0.95
	Average in 2010	0.99	0.99	0.94
	Average in 3 years	0.98	0.99	0.95
Phoenix Tours	Average in 2008	0.99	0.97	0.95
	Average in 2009	0.98	0.98	0.93
	Average in 2010	0.97	0.96	0.93
	Average in 3 years	0.98	0.97	0.94
Hong Thai Travel	Average in 2008	0.90	0.88	0.86
	Average in 2009	0.91	0.89	0.89
	Average in 2010	0.92	0.88	0.89
	Average in 3 years	0.91	0.88	0.88
Lion Travel	Average in 2008	0.99	0.98	0.96
	Average in 2009	0.98	0.99	0.93
	Average in 2010	0.99	0.98	0.91
	Average in 3 years	0.99	0.98	0.93
Beneficial Travel	Average in 2008	0.83	0.82	0.84
	Average in 2009	0.83	0.83	0.81
	Average in 2010	0.85	0.81	0.80
	Average in 3 years	0.84	0.82	0.82
Life Tour	Average in 2008	0.86	0.83	0.80
	Average in 2009	0.85	0.81	0.80
	Average in 2010	0.84	0.82	0.81
	Average in 3 years	0.85	0.82	0.80
Cola Tour	Average in 2008	0.84	0.85	0.84
	Average in 2009	0.86	0.83	0.82
	Average in 2010	0.83	0.82	0.83
	Average in 3 years	0.84	0.83	0.83
Hi-Lite Tours	Average in 2008	0.79	0.77	0.79
	Average in 2009	0.80	0.79	0.78
	Average in 2010	0.76	0.76	0.79
	Average in 3 years	0.78	0.77	0.79
Skylark Travel	Average in 2008	0.86	0.85	0.84
	Average in 2009	0.87	0.86	0.84
	Average in 2010	0.87	0.85	0.82
	Average in 3 years	0.87	0.85	0.83
Ming Tai	Average in 2008	0.75	0.72	0.73
	Average in 2009	0.72	0.71	0.71
	Average in 2010	0.73	0.71	0.72
	Average in 3 years	0.73	0.71	0.72
Total	Average in 2008	0.88	0.87	0.86
	Average in 2009	0.88	0.87	0.85
	Average in 2010	0.88	0.86	0.84
	Average in 3 years	0.88	0.87	0.85

**(2) Malmquist Productivity Analysis.** Table 2 displays the Malmquist efficiency analyses for 2008-2010. From the table, total factor productivity of South East Travel, Phoenix Tours, and Lion Travel is larger than 1, but the rest tourism businesses are

less than 1, showing the decrease of productivity. In terms of pure technical efficiency, the efficiency of South East Travel, Phoenix Tours, and Lion Travel are improved, while the rest tourism businesses get worse. In regard to the scale efficiency between two stages, South East Travel, Phoenix Tours, and Lion Travel approach the permanent optimal scale, while the rest tourism businesses tend to go away from the permanent optimal scale. Moreover, regarding technical changes between 2 stages, South East Travel, Phoenix Tours, and Lion Travel show improvement in production technology, but not the rest.

**Table 2. Malmquist efficiency analyses, 2008-2010**

Business	TECHCH	PECH	SECH	TFPCH
South East Travel	1.02	1.03	1.02	1.04
Phoenix Tours	1.05	1.04	1.05	1.03
Hong Thai Travel	0.93	0.94	0.92	0.91
Lion Travel	1.04	1.02	1.03	1.05
Beneficial Travel	0.95	0.95	0.94	0.96
Life Tour	0.97	0.97	0.96	0.97
Cola Tour	0.93	0.91	0.91	0.92
Hi-Lite Tours	0.98	0.98	0.99	0.99
Skylark Travel	0.96	0.97	0.96	0.96
Ming Tai	0.82	0.84	0.83	0.82
Total	0.97	0.97	0.96	0.97

**V. Conclusion and suggestions.** Having the years 2008-2010 be the dimensions, this study investigates the tourism businesses in Taiwan, in which 10 travel agencies are the valid samples. Data envelopment analysis is applied to evaluate their business performance. According to the research outcomes, the total efficiency, the pure technical efficiency, and the scale efficiency of South East Travel, Phoenix Tours, and Lion Travel are higher than those of the rest businesses. It is considered that, in addition to promoting various travel services, they have integrated the resources for organization of distinct services and their progress in innovative management is earlier than at the others. Innovative management has become an important tool for tourism businesses to implement policies and establish a new operation management. Since all services are based on innovative management, it therefore becomes a key element in tourism operations. Consequently, innovative management is a major strategy in tourism industry, it is not simply an innovation in procedures and management, but the innovation of business model. The value of innovative management is to enhance productivity, to reduce nodes in the procedure, and to promote management value so that management synergy could be generated from the presentation of various reports in daily business as well as real-time information flow in a company could be controlled. It aims to master key technologies for a company.

**Reference:**

- Ardahaey, F.T.* (2011). Economic impact of tourism, *International Journal of Business & Management*, 6(8): 206-215.
- Buhalis, D.* (2000). Marketing the competitive destination of the future, *Tourism Management*, 21(1): 97-116.
- Betz, F.* (1993). *Managing Technology Competing Through New Ventures, Innovation and Corporate Research*, Prentice-Hall.
- Briassoulis, H.* (2002). Sustainable Tourism and the Question of the Commons, *Annals of Tourism Research*, 29 (4): 1065-1085.

- Chiang, W. E., Tsai, M. H., and Wang, L. S. M.* (2004). A DEA evaluation of Taipei hotels, *Annals of Tourism Research*, 31:712-715.
- Chiu, Y. H., Wu, M. F.* (2010). Performance evaluation of international tourism hotels in Taiwan - Application of context-dependent DEA. *INFOR*, 48(3): 155-170.
- Cooper, W.W., Seiford, L.M., Tone, K.* (2000). *Data envelopment analysis: A comprehensive text with model, Applications, References and DEA-Solver Software*, Kluwer Academic Publishers, p. xix-xxix.
- Farrell, M.J.* (1957). The Measuring of Productive Efficiency, *Journal of Royal Statistical Society*, 253-281.
- Fried, H.O., Lovell, C.A.K., Schmidt, S.S.* (1993). *The measurement of productive efficiency: Techniques and applications*, Oxford University Press.
- Golany, B., Roll, Y.* (1989). An Application Procedure for DEA, *Omega*, 17(3), p. 237-250.
- Hung, Jung-Chao* (1999). Innovative management as the new power for enterprises, *Management Magazine*, 296, February, p. 44-47.
- Lin, Ching-Jung* (2002). A Study on Operation Efficiency of Domestic Airlines in Taiwan, Graduate Institute of Technology Management, National Taiwan University of Science and Technology.
- Pels, E., Nijkamp, P., Rietveld, P.* (2003). Inefficiencies and scale economies of European airport operations, *Transportation Research Part E: Logistics and Transportation Review*, 39(5), p. 353-360.
- Sarks, J., Talluri, S.* (2004). Performance based clustering for benchmarking of US airports, *Transportation Research Part A: Policy and Practice*, 38(5), p.329-346.
- Thomke, S.* (2001). Enlightened Experimentation: The new Imperative for Innovation, *Harvard Business Review*, 79(2), p. 66-75.
- Tomala, F., Senechal, O.* (2004). Innovation Management: A Synthesis of Academic and Industrial Points of View, *Project Management*, 22(4), p. 281-287.
- Scott, N., Laws, E.* (2006). Knowledge sharing in tourism and hospitality, *Journal of Quality Assurance in Hospitality & Tourism*, 7(1/2): p. 1-12.
- Warnken, J., Buckley, R.C.* (2000). Monitoring Diffuse Impacts: Australian Tourism Developments, *Environmental Management*, 25(4): p. 453-461.
- Young, G.J., Charns, M.P., Shortell, S.M.* (2001). Top Manager and Network Effects on the Adoption of Innovative Management Practices: A Study of TQM in a Public Hospital System, *Strategic Management Journal*, 22(10): p. 935-951.

Стаття надійшла до редакції 15.09.2011.