

Value Enhancement in the Thai Tourism Industry- Implications of the Online Travel Business

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Project Summary

Findings

1. Tourism contributes 6% of Thailand's GDP at 323.5 billion Baht – increasing at 6% per annum, in contrast to 3.4% for GDP (five-year compound averages); this topic demands close attention.
2. The value chain shows the travel intermediaries as a key extractor of revenues from end users and suppliers due to informational barriers.
3. Evolving from low-margin manufacturer to high-margin design and marketing provider is possible by developing domestic (online) travel intermediaries.
4. Travel intermediaries must progress from service of demand-supply matching and payment transferal, to demand enhancement, database analysis, and financial contract issuance for revenue and risk management.
5. The market structure of tourism is analogous to that of agriculture, railroads as well as airlines, characterized by high entry cost and low marginal cost with inadequate information flow between suppliers and consumers. This leads to destructive competition and/or intermediary exploitation, particularly when intermediaries have market power.
6. Dynamic pricing can be extended and managed by online intermediaries.
7. Contracts between intermediaries and hotel operators are comprised of pre-paid contracts and reserved allocations that may involve a fee analogous to an option premium; remaining capacity is sold on a free-sale basis analogous to commission sales. These contract prices exhibit characteristics of spot prices, forwards and options.
8. The agriculture industry resolved the price elasticity risk induced by market structure problems and separation of consumers from producers through the mechanism of forward and futures contracts. This approach offers great promise for the airline and hotel industries.
9. An analytical solution to the hotel operator's seasonal capacity allocation problem can be based on a linear/quadratic programming approach that determines the choice fixed or variable contracts and accommodates risk and seasonality.

10. An analytical solution to the intermediary's problem of assuring supply to meet predictable demand is based primarily of unconstrained maximization of expected revenues by choice of fixed or variable contracts.
11. Intermediaries can profit from economies of scale by developing and exploiting databases. This permits optimization of the agent's problem in contract choice as well as the hotel operator's problem, the latter solution being sold on a consulting basis to hotels lacking the capacity and expertise to analyze demand.
12. The key element in resolving contract choice is generating precise estimates of demand on a seasonal basis. Much of this is a combination of statistical analysis and personal experience and understanding of sub-markets.
13. An important ancillary aspect of the intermediary's operation is the design and marketing of alternative tourism "experiences" in order to balance seasonal disparities and increase domestic value-added capabilities.

Specific recommendations

1. An intermediary should design and produce a scheduling tool, such as the example given, for the use of hotel operators in planning their capacity utilization.
2. An intermediary should select its own mix of supply contracts through a tool based on analysis of demand patterns and linked to revenue maximization, as indicated by the example given.
3. The creation of futures markets with standard contracts in hotel rooms and air tickets would enhance the markets in both products and aid risk management.

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Value Enhancement in the Thai Tourism Industry - Implications of the Online Travel Business

The purpose of this study is twofold. Primarily, the intent is to identify the features of the travel and tourism industry and provide an economic analysis that will indicate opportunities for value creating strategies. As a result, it then demonstrates the importance that a large, publicly recognized online travel intermediary would have for the further development and increased profitability of the Thai tourism industry.

This report provides direction to the creation of such a travel intermediary by showing where the information available from online sources can be used to improve the design and pricing of services in the hospitality sector. It also gives a summary of how the information is to be used in analytical methods to optimize the sale of capacity in the sector under certain types of contracts.

The findings include introductory material indicating the significance of the industry as a sector in the Thai economy, and a summary of the value retention by the various players in the industry, both domestic and international. There is also a brief strategic analysis of the industry by comparison to modern trends in corporate development from a national planning perspective. This comprises the characterization of the role played by travel intermediaries in the traditional sense as compared to a wider and more crucial position that can be occupied by an online intermediary, using its larger database and sophisticated planning tools. The analysis is focused on enhancement of the role in the design of tourism services, in marketing, and in financing issues, with possible implications for capacity production. The report explains the macroeconomic, microeconomic and financial issues involved in the industry and their implications for the creation of an effective online intermediary. It concludes with an outline of some analytical tools needed to optimize the pricing and sales policies of the basic service providers and intermediaries.

1. Scope of the Tourism Industry

Statistical aspects

Current statistics on tourism indicate that it is now the largest “export” industry globally and for Thailand in particular. Different statistics and classifications provide alternative measures, with \$474.2 billion in annual global tourism revenues estimated by the World Tourism Organization, and over \$600 billion when passenger transport is added. For Thailand, 323.5 billion Baht in tourism revenues constitute 6% of GDP as of 2002. Furthermore, the growth rate in revenues of 6% compared to the average GDP growth of 3.14% in the past five years implies that the potential share of GDP is even greater. (A steady rise in share of GDP from 4.66% in 1997 to 6% in 2002 illustrates this - see charts Appendix A.)¹

Of the latest sales volume of 323.5 billion Baht, however, it is estimated that only 30% is retained by Thailand, with the remainder flowing to foreign hands. This figure contrasts with estimates as low as 20% for Caribbean nations (highly dependent on tourism but exposed to cruise liners) and as high as 60% in India. These retention rates follow from “leakage” due to import of supplies and materials unavailable in the host country (international standards and tastes) and to export of financial flows (repatriation of profits earned by foreign investors) plus overseas promotional expenditures.² On the other hand, a standard estimate maintains that each direct “dollar” of tourist expenditure is matched by another dollar of indirect earnings in the host country.

As well as leakage from the gross receipts of tourism, there are additional sums lost from tourist expenditures. Most of these are comprised of foreign carriers’ fares and foreign travel agents’ fees and profits. Increasing the share of domestic airlines and travel agents then can have a significant effect on increasing tourism revenues. Various studies have also questioned the net benefits of tourism at differing stages of development, which may be an issue of timing of investment and return cash flows. Costs of building infrastructure added to congestion may well make expansion of tourism a short-term negative proposition. Nevertheless, tourism is generally

¹ See also the TAT (5) estimates for future growth.

² See UNEP report (4) for descriptions of economic effects and leakage.

accepted as being beneficial on the whole and specifically to economic development. In summary, the size of the actual and potential tourism market more than warrants efforts to increase both its gross and net revenues.

Estimates of the potential for aggregate gains by modifying the structure of the tourism industry within Thailand can be based on increasing the domestic share of the industry. A ten percent improvement (from the current thirty percent) in the retained portion of current revenues represents 32 billion baht per annum, a figure growing at six percent; alternatively, this would be a one-third increase in current net tourism revenues. Other estimates of indirect benefits matching the direct benefits are perhaps less likely to be fully realized; the increase in retention is to be gained by an increase in profits to existing players, which have lower secondary effects.

Value chain and value retention

The value chain in tourism can be summarized as formed by the end user or consumer, who pays the total sales (above), linked by the carriers (largely airlines) to the hotels/resorts, restaurants, physical attractions and other members of the hospitality sector, with the linkage provided by the travel intermediaries, themselves either domestic or international. (See diagram Appendix B.) With 25% as a minimal target profit margin for a large intermediary, plus other agent's fees, it is clear how significant is the share of the value chain captured by the intermediaries; of this the portion taken by domestic Thai agents is estimated to be minimal.

This structure leads to the following observation. The transfer of payments between the users and the providers of the goods and services in the tourism industry is filtered, at a cost, by the travel intermediaries. This filtration is either a friction on the efficient transfer between the two parties, or else it is a valuable and necessary service that enhances the enjoyment of the product by the end users, for which a reasonable price is charged. Most likely is that a combination of the two positions is true, with the friction viewpoint implying that a "tax" is imposed on users' ability to afford and enjoy the goods and services provided, and with the same "tax" reducing the profits of the service providers. The justification for the intermediary services comes from the fact of informational barriers between users and providers, plus the possibility that experienced travel consultants have built up capital which is rewarded by their ability to charge for enhancing the tourism experience of average consumers. Both of the extreme positions, and the combination of them, suggest immediately that

more efficient intermediaries in a competitive market have the potential to reduce the “tax” by improving the information flow. With modern technology, online services offer the benefits of lower overhead and centralized databases that can both ensure the reduction of the “tax” and identification of opportunities for enhancement of tourist satisfaction and matching of needs and solutions. A further benefit is the opportunity for the intermediary to provide data-based analysis of travel patterns that will allow service providers to refine their offerings and pricing strategies.

The conclusion is that an online intermediary will implement the IT (information technology) application to tourism resulting in value creation; this is analogous to the benefits for world economies, finally recognized in the 90’s, of the computer/internet revolution. The anticipated benefits of the computer were delayed well beyond expectations in terms of productivity enhancement until the potential was realized through the full deployment of communications networks; so too, the conventional use of computers to achieve ticket bookings can be greatly extended by merging this technology with database exploitation, now seen through CRM (customer relationship management).

2. The Evolution of Corporate Strategies

Developed nations

Increasingly in fully developed economies, corporations are recognizing that a truly vertically integrated production process results in lower return on capital. In a developed society, high labor costs and capital intensive production facilities cause production to be non-competitive. Consequently, successful corporations in Europe and North America are turning to out-sourcing of low-margin manufacturing operations. High-margin activity consists of the creative design of product and services, which are then distributed using advertising and branding for the enlargement of market demand and also using sophisticated delivery channels. This process is further aided by arranging financing and structuring contracts to build markets and sales, as well as potentially affecting capacity building for production. This strategy has been implemented from such established industries as auto manufacturing (where parts production and assembly may be largely off-shore) to modern technologies such as computer hardware (chip manufacturing) and software

(code writing); what were only recently recognized as high technology endeavors are now seen as high volume “commodities” to be produced in low-labor cost locations.

Developing nations

The evolution of developing nations can easily be seen as a response to developed nation initiatives. Where, earlier, nations might attempt to emulate and compete with developed nations in basic industries, now those basic, and even advanced (such as chip manufacturing) industries are left increasingly to developing nations. In fact, they are encouraged to develop those industries in accordance with the needs of the corporations in advanced societies for production under an out-sourcing program. In essence, developing nations are forced to follow the direction of more advanced nations, acting as branch plants – a perhaps harsh characterization, but not surprising or novel. This posture can either be accepted or challenged. The challenge is hard to pursue, however, if the capital is lacking in the developing nation, be that capital financial or human. In the tourism industry, Thailand can have the resources necessary to mount the challenge, with neither large financial capital nor unattainable creative resources required to implement such a strategy. The report argues that Thailand already possesses unique “production” facilities; with the help of online travel agencies, it can also provide the design and marketing aspects.

3. The Role of the Travel Intermediary

The traditional role

As a rule, the services provided by travel intermediaries have been centered on three areas – marketing, design and financing. A travel agency, by conventional advertising and increasingly by electronic publicity, attempted to attract customers for whom they would arrange travel by carrier and lodging at the destination. Advances in the field led them to attempt to channel the clients to appropriate destinations, aided by familiarity with repeat customer habits and client preferences. In general, the response to new clients was reactive, offering specific hotels and carriers that would meet the stated requests, primarily cost-based with attention to the level and type of facility needed. Increased use of computers offered the potential to establish a data base on

past customers, but small scale operators were unlikely to have the capacity to employ a sophisticated data base analysis system.

Business could be enhanced by combining services into packages of carrier and hotel, sometimes enhanced by theme-based add-ons such as golf vacations. This notion suggests that a successful intermediary could benefit from taking a creative role in designing attractive packages for different clienteles; hence building scale implies placing resources in the design area.

Initially, the role of the intermediary was to match the demand from known or new clients to the inventory of passenger seats and hotel rooms accessible to the intermediary. Generally, the inventory was identified by online connection to vendors of the services. Matching supply and demand then placed the intermediary in the position of passing through the payment while extracting a fee from the supplier. More recently, this role has expanded for larger agencies acting as wholesalers or higher level intermediaries who will re-sell to travel agents or tour group operators in direct contact with clients; these wholesalers have booked allotments of rooms at reduced prices to them, which are then re-sold at a profit. The allotment on a contractual basis is a risk-reducing strategy for the supplier that may be likened to a commodity forward contract, but which does not enjoy the efficiency of forward and futures markets. (The report returns to the issue of the risk-return implications of this contract below.) An alternative arrangement is an allotment on a “best efforts” basis, which reserves capacity for agents with no firm commitment; the allotment in effect grants an option to sell capacity at a lower cost (the exercise price) than to be received from the clients. “Free sale” arrangements with hotel operators sanction the travel agencies as agents who can sell capacity within the currently available supply. Free sales to some degree and allotments to a greater degree limit the hotel operator’s ability to manage capacity and extract a higher price for the units, but help to guarantee revenues by increasing the probability that the units will in fact be rented.

An implication of increased scale and the opportunity to profit from commitments to purchase capacity is the potential involvement in capacity planning. Rather than identifying supply and obtaining the right to sell from available inventory, a large intermediary could instead cooperate with the hospitality providers to advise on market potential, provide future guarantees of sales, and even participate in financing of development. The extreme of this potential, however, would require a scale and acceptance of an operational risk that is unlikely to exist; more probable is

the expansion by a resort or hotel developer into the travel intermediary field to attempt a vertical integration of the operation.

Online agency potential

The initial impact of creating an online capability for a travel intermediary is the creation of a low overhead operation having the potential to transact business with customers on a world-wide basis. Efficient systems should permit rapid low-cost response to inquiries and execution of bookings. Electronic entry of all information leads to a reduction in handling costs. Furthermore, the spatial limitations of a “bricks-and-mortar” operation are eliminated, leading to a vast expansion in the potential market of end users. These obvious implications, however, overlook many more important aspects of the business model.

Online operations immediately create a comprehensive database of potential clients that identifies sales opportunities for directed marketing. This database is subject to statistical analysis to identify trends and generate descriptive measures to aid in planning. At the other end, the travel intermediary can create a dynamic inventory system for accurate information on availability in future periods. Recorded sales and purchases lead to efficiencies in bookkeeping. Scalability is relatively unrestricted, with only incremental hiring of personnel and the installation of larger servers needed to accommodate increased volume. Once the initial investment in software has been made, expansion is tied to the rate of market growth. Personnel are needed for development of the supply side of business, rather than for staffing physical offices for client contact.

Development of database analysis tools enables an intermediary to offer a new kind of service to hotel operators. Building on the statistical patterns, the intermediary can provide information to hotels as to predictable future demand and recommend pricing strategies to increase hotel profits. This can be done on a consulting basis or even by the development of analytical packages to be used by the hotel in planning its own capacity sales at different times of the year. A further enhancement would be the coordination of marketing initiatives that would lead to demand smoothing, made possible by the size of the intermediary and reach to end users as well as the integrated perspective on capacity utilization in defined areas and periods. Another initiative could be a loyalty program with “points” usable at affiliated hotels, administered by the agency, would help to compete with international chain programs.

Once a critical level of volume has been built, the crucial element of diversification can be achieved. This allows an intermediary to engage in risk-taking contracts with lower exposure than is tolerable by individual hotel operators. At a certain level of operation, the intermediary can safely afford to accept allotments, which can be filled from a predictable arrival of demand. Hotel operators then shift demand risk to the intermediary with a resulting increase in the value of their operations. The experience gained between operators and the intermediary will then lead to the development of more contracts for capacity sales. Effectively, the achievement of a critical size by the intermediary implies greater ability to act as an agent for suppliers and results in enhancement of value for both suppliers and the intermediary.

In addition to this technical or quantitative benefit of size, a more qualitative advantage also accrues to gaining scale and experience. Exposure to a larger client base will enable an intermediary to launch packaging initiatives. Hence the opportunity to exploit specific local attractions or experiences, such as golf, spas or cultural and artistic events and themes, can be developed. The online capability enables the intermediary to promote new attractions rapidly and broadly in response to changing conditions, in contrast to a conventional approach of designing, printing and distributing brochures through physical agencies. As well, advanced methods of presenting visual images can provide prospective clients with far more detail, inspiring greater confidence in quality and aiding sales. This feature can be tailored to current capacity information in order to achieve seasonal demand balancing.

The greater international reach and technical capabilities of online access should be exploited to promote more of Thailand's attractions to potential visitors in order to stimulate a broader and higher-valued range of demand. Moving panoramic images of natural attractions, of spa treatment and surroundings, or of the details of Thai artistry and craftsmanship would effectively present the experience to be expected on a theme-based visit. These kinds of attractions have the added benefits of attracting higher-end tourists, of offering services which require no off-shore inputs hence reducing leakage, of stimulating domestic production, and of providing alternatives to the established conventional beach travel sales. Since the production of such advertising is both costly and difficult to retain as proprietary on websites, this activity should probably be undertaken by TAT as a more effective means of promoting Thailand for tourism.

Experience gained from a nascent local agency (Morethailand.com) reveals that a major problem before achieving critical size is supply related. Development of business depends upon obtaining to the right to sell capacity. To the extent that suppliers are constrained from over-selling, they prefer to supply larger intermediaries with more perceived marketing potential. This creates a vicious circle of restricting growth due to supply, leading to further restrictions in supply. A solution to this is for the agency to commit to purchases of capacity; but this strategy must be followed without the protection of having reached the critical size that enables it. In other words, the intermediary must risk a substantial amount of capital in building volume, quite probably by making marginally losing contracts between suppliers and clients.

Data indicate that a vast number of “visits” to website alternatives yield a small number of actual inquiries for potential hotels. The key feature of the online approach is the elimination of the activity by a travel agency to sift through the possible locations and facilities; the size of this activity is measurable by the number of “visits” made by clients before making a formal inquiry. The ratio of the number of initial “visits” to total “visits” registered is on the order of two percent, indicating an average of fifty informational efforts made by each client in arriving at a formal inquiry. The success rate of these inquiries, i.e. sales generated is fairly high, though, at 30%-35% of the inquiries; another small number of inquiries (on the order of three percent of them) are rejected due to the unavailability of capacity at specific locations. Experience also suggests that the nascent online agency can purchase and re-sell capacity from a larger traditional agency when the electronic orders cannot be met by finding spare capacity. This is likely to be low margin or even a loss-making activity, yet it does have the benefit of helping to build volume; on the other hand, it does not lead to building experience with the suppliers that will facilitate future contracts.

Supplier – intermediary relations

Interviews with smaller hotel operators reveal that they are skeptical of leaving their booking plans in the hands of the intermediaries. They report that pricing and contract terms recommended to them by intermediaries differ from their own impressions of the optimal way to respond to their perception of current market conditions; intermediaries predictably appear more likely to suggest that demand is lower than the actual level in order to obtain more favorable (lower-priced) contract terms. They also recognize that the presence and domination of large intermediaries reduces their own

market power and places them in a precarious position for enjoying satisfactory returns on investment; they understand the importance of supporting smaller intermediaries who will be unable to exploit market power and informational asymmetries. Despite pressures from large international intermediaries to monopolize allotments, they make efforts to resist and are prepared to retain capacity for smaller intermediaries who can offer them reasonable prospects of sales – preferably by firm commitments to take capacity in all seasons. They also appear to operate on an instinctive reaction to their perceptions of current demand conditions, leading them to booking decisions with individuals or intermediaries. As such, they would benefit from technical approaches to determining optimal booking plans.

4. Economic Considerations

The characteristics of the tourism industry embrace a range of economic issues from the traditional to the more recently developed. These include monopoly/monopsony aspects, barriers to entry, fixed and variable cost structure, homogeneous /heterogeneous goods, product differentiation, dynamic pricing, incomplete information and financial contracts.

Market structure

As outlined in the value chain above, the tourism industry is affected by both monopoly and monopsony features, although more accurately it is a situation of oligopolist and oligopsonist behaviour. On the one hand there are clearly atomistic clients, who interact with travel agents; the latter are composed of both small and competitively acting agents and large agencies having market power. At the other end, there are relatively competitive suppliers of services of varying sizes providing a limited capacity which is expandable within a mid-length horizon. Large travel intermediaries act oligopolistically with respect to individual clients or to smaller agents when functioning as wholesalers. Large hotel chains can deal directly with clients using brand recognition or with intermediaries; when the latter have sufficient size, it can be assumed that the relationship, while not atomistic, is fairly competitive. Smaller or single site hotels may deal with smaller agents in a relatively competitive

framework, but face monopsonistic behavior when interacting with large intermediaries controlling large tourist volumes.

A second feature of the market is the presence of both homogeneous and heterogeneous goods. Both in the airline and hotel business, there is a gradation of product from basic to luxury. In practice, one can adopt a small discrete classification of levels of product and consider the services within class as relatively interchangeable or substitutable; yet it is important to recognize individual client preferences as having some distinguishing effects, particularly at the higher class of product. Because of fixed capacity, inventories cannot be accumulated to satisfy later demand. Yet the problem is a multi-period problem within which some inter-period substitution is possible. Furthermore, across different seasons the demand and the perceived value of the product varies greatly. A further complication is the degree of substitutability across regional or national boundaries. In summary, there is probably sufficient size of supply and demand in most categories (across time, location and class of service) that one can consider this to be homogeneous within each cell, but substitutable to a degree between “adjacent” cells. (A good analogy is to consider the bond market, in which characteristics such as maturity, issuer and rating, and currency denomination all distinguish cells, but ultimately there must be consistency of price between the cells, given the purchaser’s willingness and ability to substitute.)

Price determinants

The tourism industry is susceptible to the high fixed cost and low variable cost of providing additional capacity. Both hotel operators and airlines face similar issues, even if certain characteristics, in particular regulatory policies, are unique to each.

In the much-studied airline industry, where there were previously seen to be high barriers to entry due to the cost of planes and landing rights, the emergence of successful low-cost airlines belies that view. The ability to lease planes with the vast oversupply of moth-balled planes, as well as the possibility of using lower cost airport facilities have made entry relatively easy (compared to previous notions). Hence the break-even volume for new entrants has been lowered to the point of feasibility for a supposedly high-entry cost industry. This low-cost competition has then led to the near or actual bankruptcy of major carriers having a higher cost structure. Predatory pricing strategies by major carriers to eliminate smaller competitors, previously

successfully implemented by financial resources, have been circumscribed by the severe cash flow problems the major carriers have been suffering.

The key issue, of course, is fixed versus variable cost components. The variable cost of an additional passenger to a given flight is virtually zero. Combining the unit size (large or small planes) with personnel costs (high salaries for major airlines versus low salaries for new entrants), the result is a complicated analysis that finally appears to favor the smaller, new entrants. Elements of the structure include seasonality of demand, passenger willingness to accept lower service, negative reputation impacts of discriminatory prices, positive reputation impacts of promotional prices (e.g. seat sales at the \$5 level – plus taxes), ability to reach customers with offers, and others. Finally, however, airlines can contribute marginally to overhead by selling at prices yielding marginal profits but overall losses.

In the hospitality industry, many of the same aspects apply. Additional guests cost only the servicing of the rooms, which for a fixed staff component is virtually zero again. The elements of the airline industry (mentioned above) affecting the cost structure are equally relevant. The important differences between the industry include primarily the absence of international regulatory policies that apply to large carriers (with all the implications of national economic strategies), the vastly increased number of suppliers as the entry costs can be lower together with the scale issue (linked to entry cost). Hotels can be scaled at a relatively continuous level from small to large, affording even greater flexibility than in airlines with standard planes of varying capacities. The presence of more variety and greater numbers of suppliers implies that the ability of most suppliers to have direct access to potential customers is severely limited. Only large international chains have the marketing potential and brand recognition that parallels airlines; smaller hotels can only hope for referrals by travel intermediaries and repeat customers based on satisfactory experiences.

A significant characteristic of the hotel industry, in contrast to airlines, is the real possibility of product differentiation. Essentially, airlines can advertise superior and distinctive service, but to the average traveler, their product is virtually homogeneous and price, schedule and convenience become the only considerations in choosing between competitors. Not only do general and specific location of hotels provide distinct attractions, but also décor and unique services offered will cause clients to differentiate and choose on product characteristics as well as price. This implies that variables under direct control can affect pricing and profitability. On the

other hand, for vacation destinations, the seasonal nature of client travel patterns and climatic characteristics leave the operator with little control or the ability to find many load-balancing remedies.

Given the similar and distinct aspects of the hotel industry, the fundamental characteristic remains the same – the pricing decision can be made in reaction to covering marginal costs. The resulting action can again lead to short-term beneficial policies that produce long-term losses. In fact, the financial situation of the tourism industry appears to be healthier than that of their airline counterparts. Except when major economic catastrophes, caused by incidents like SARS or terrorism, disrupt normal patterns, pricing policies tend to leave the majority of hotel operators with tolerable, if minimal, profits.

Incomplete information

The role of the intermediary in the market for tourism goods is justified by the inability of both suppliers and consumers to have adequate information on the supply and demand curves. The incomplete information results primarily from the distance separating the two parties at the time the contract needs to be made. The consumer's problem of determining the availability of supply is exacerbated in part by uncertainty as to the quality of the product. Both of these issues can be resolved by an informed intermediary. Increasingly, the supply of airline seats can be established by online reservations systems from the carrier, although the prices can usually be bettered through an intermediary who has reserved capacity at a lower price. In this case, the quality is of no or minimal significance as an unknown.

For hotel units, however, both the greater fragmentation of the suppliers and the lower degree of standardization lead to the potential for value additions by informed intermediaries. While hotel operators could conceivably establish websites, there is little prospect of individual consumers chancing upon these sites. Hence, the potential exists for a large online travel intermediary to aggregate the supply potential of numerous hotels and transmit this to end users at low cost, thereby increasing the efficiency of the market by enhancing information flows. Quality of the hotel facilities is important, but assurance of quality is difficult to convey at a distance.³

³ Informational asymmetry issues in the tourism industry are contained in Hoontrakul (2).

Dynamic pricing

The intent in modern pricing practice is to extract as much as possible of consumer surplus from all classes of clients through what is recognized as discriminatory pricing. As is well known, the posted price (rack rate or full economy) is a maximum price that only the desperate or uninformed client will pay. Beyond that, there are deluxe suites and first/business class seating. Such rates will extract virtually all of consumer surplus. One may presume that informed clients who are sensitive to price (personal travelers or constrained business travelers) will make efforts to obtain lower prices from the same supplier or seek alternative suppliers in a competitive market; this again ensures that demand at below the highest price level can be filled.

Revenue management is a strategy employed to ensure the maximum sale of limited capacity while obtaining as high a price as is possible from units of that capacity sold independently to different customers who have incomplete information as to the price. The technique is applicable when the capacity is not transferable to preceding or following periods and hence is wasted if not used; the possibility of mild substitution in time amplifies the difficulties in optimizing the process, but does not invalidate the concept. Dynamic pricing is then the process of offering prices to different clientele based on analysis of remaining capacity and of demand patterns. Airlines have refined the dynamic pricing strategy through an almost continuous process of adjusting advertised prices to reflect remaining capacity and proximity to flight date. The hotel industry is beginning to practice a form of this, but with far less success and intensity.

One of the principal variables in dynamic pricing is the amount of capacity that has been allocated to other agents acting as intermediaries between the service provider and the clients. Airlines are currently attempting to use their own individual or group online reservation systems to make direct contact. This is successful to the degree that customers recognize and remember the airlines' names to search for them, and to the extent that those customers do not believe that alternative intermediaries may offer better prices. With the aim of risk reduction, pre-sale of capacity to intermediaries guarantees a number of sales at profitable, even if low margin, prices, thereby helping to realize coverage of overhead. Conceivably, a supplier of capacity could pre-sell to intermediaries enough to cover fixed costs plus variable costs on the sold capacity; remaining capacity would be retained for higher margin direct sales. In

transferring risk to the intermediary, the supplier clearly must transfer a commensurate reward from its own potential profits. Also, the potential to sell remaining capacity is sharply curtailed by the existence of lower priced capacity in the hands of the intermediary.

Industrial parallels

The environment described for the tourism industry has direct parallels in other markets. Historically, the railroads were examples of high entry and fixed cost with a high degree of immovable assets, between track and rolling stock, and low variable cost. The result of these conditions was a market failure illustrated by illogical contract design and pricing, which ultimately led to strict regulation. Similarly, the airline industry became intensely regulated, before the deregulation that may well be responsible for the virtual or actual bankruptcy of so many carriers. Another example is agriculture, again having immovable assets plus high leverage through expensive equipment; the severe price elasticity of the output, despite atomistic end demand and very competitive supply, led to rigid regulation and government intervention.

In each of these cases, national policies with respect to essential industries, self-sufficiency, safety and standards, even national identity or reputation conveyed by a flag carrier, have affected decisions that need to be made on the basis of economic principles. The basic unifying theme to these industries, and one shared by the tourism industry, has been the instability created by the price elasticity resulting from the market structure. Competition between suppliers in the face of low variable costs, usually complicated by the presence of intermediaries who possess information about both supply and demand, has threatened the health of supply judged to be crucial to national security or welfare. Regulation has then been the natural response.

Another aspect of regulation in agricultural markets is supply management. In order to protect the supplier and guarantee future capacity, governments limit either the number of suppliers or the capacity of individual suppliers. One mechanism for this is to grant licenses for levels of production, which have the questionable property of making the license for a unit of output worth more than the actual production facility for that unit. This has evolved into landing rights (and associated properties) in the airline industry. Whether increased regulation in the hospitality industry is a useful solution should be debated.

Demand Patterns

Analysis of demand for capacity on airlines and in hotels is complicated by a number of factors. The first issue is the segregation of clients into at least two categories, namely leisure and business, which will be subject to different influences affecting demand. Next, for the leisure segment, which is referred to as tourism in the focus of this study, there are issues of economic prosperity in the client countries, seasonality and the associated weather in client and host countries, and unexpected world or local events (such as SARS and terrorism). The final demand in a host country is a combination of the business and leisure segments and of the individual client country contributions. Intensive analysis to predict demand consists of analyzing the patterns from each major client area or country and combining the results. (Such analysis is conducted by TAT, and constitutes a valuable service.) A reasonable description of the end demand patterns for each season is then a normal distribution that is subject to “regime shifting” under major events that would alter the mean and standard deviation.

5. Financial Aspects and Instruments for Tourism Contracting

Asset/Liability matching

The nature of the intermediary’s contracts with suppliers and clients involves an asset and liability structure having some parallels with the banking and natural resource industries. An intermediary signing committed contracts with a supplier to reserve and pay for a fixed supply of rooms has both an asset in the available capacity and a liability in that the capacity must be paid for and re-sold. The rooms have a fixed price to the intermediary, with the payment to be made either in advance or as the rooms are sold (a forward contract, in effect). The sale of the rooms to clients is conducted in the spot market. Hence the intermediary is in the same position as a producer of commodities such as metals, who would frequently hedge anticipated production by arranging forward sales and financing from banks.

Another perspective is to consider the problem faced by a deposit-taking and loan-making bank. In this case, a portfolio of loans and deposits can be matched for maturity to avoid interest rate problems, or hedging strategies (gap management) can be employed. In a similar way, the travel intermediary faces price uncertainty due to demand shifts; this bears on the mismatch of longer fixed price contracts for supply

with short-term contracts to clients at prices dependent upon the demand-based spot price for rooms. Under current conditions, there is no mechanism for the intermediary to escape this risk analogously to the methods used by financial institutions (or by production hedgers).

Forms of contracts

There exist three types of contracts by which capacity providers can allocate their current and future capacity. In terms of financial markets, these fall into the categories of pricing in spot markets, futures or forward markets, and options markets. The basic sale of a room or a seat by supplier to consumer is conducted in a spot market. Other than rare and temporary climatic or political events, supply is virtually fixed. The demand side is clearly uncertain, even if the distribution is fairly stable; it is however, subject to influences that threaten to modify the distribution. Given the uncertainty attached to sale of the fixed supply of product, pre-sale of partial capacity by suppliers is a risk-reducing strategy. This can be accomplished by either forward contracts or options. A forward contract, as for agricultural or other commodities, reduces the risk for both supplier and purchaser. This can be achieved by writing a contract for the allotment to an intermediary of a number of units during a fixed period. In practice, however, it appears that these commitments may not be honored by the intermediary; enforcement is subject to the continuation of good relations between the two parties and depends on market conditions. This may be analogous to the “market out” clause of underwriting. Essentially, one can characterize the contract as either a number of options on a unit (maximum capacity sold), of which a large percentage is very likely to be exercised, or as a forward contract with an attached put option to the intermediary, which may or may not be priced into the contract. Alternatively, the supplier might extend an option to the intermediary on a number of units for a fixed period; this would be under the form of a looser commitment of capacity to the intermediary, reserving the capacity in case the latter chooses to exercise when he can re-sell at a higher price. “Free sale” arrangements essentially constitute engaging an agent to sell for the supplier on a commission basis.

From the intermediary’s point of view, engaging in a forward contract through a fixed commitment fixes the price but engenders risk that the price in the spot market, which applies to sales to consumers, will be lower than the contract price. Yet the opposing risk also exists, that an intermediary be placed in a position of committing to

supplying capacity, but be unable to fulfill this without paying a premium for the necessary units in a spot market. Most intermediaries would rarely accept exposure to this risk, and avoid committing to the sale; but the loss of potential profits from inability to find a supplier is of similar scale. To avoid both risks, the agent may well choose to commit to a fixed price that is sufficiently below the expected spot price.

Intermediaries would be better served by actual options on the capacity at an exercise price yielding a probable profit. Yet the supplier has little incentive to grant these, even for a fee, unless the expected sale quantity in the spot market is not effectively limited by the potential delivery. In practice, this appears to be the actual case when commitments that are in fact only options to the intermediary are given. This situation is characterized by high market power for the intermediary, suggesting a high probability of exercising that option, combined with low direct market potential for the supplier.⁴

Details of the contract forms include the terms and timing of payments and depend on the market power of both hotels and intermediaries. A financially secure hotel is anxious to assure both future sales and interim cash flow. It is likely to extend reservation allotment contracts to larger intermediaries, who will be guaranteed a number of rooms per night, with the flexibility to accumulate and exchange capacity across periods; in return, the intermediary will make a deposit or interim payments to the hotel. The hotel has a portfolio of intermediaries with similar contracts, providing a moderate cash flow that eases working capital problems in low season.⁵ The resulting demand on capacity is subject to a number of contracts with option features. Different intermediaries each have a call option on capacity that is likely to be exercised at common times, thereby exceeding capacity; consequently, the hotel also has an option that excuses delivery given unavailability of the supply. Intermediaries are subject to a first-come, first-served discipline in exercising their options. Yet nothing in this contract actually guarantees payment to the hotel. Larger hotels, having greater visibility and sales potential, can afford to by-pass intermediaries or to

⁴ An excellent academic study of the contractual and option aspects pertinent to the tourism and related industries is contained in Spinler (3).

⁵ The credibility of the hotel in securing working capital loans from banks is also enhanced by the reputation of the intermediaries as dependable sources of later income. Issues of working capital and timing of payments are of secondary importance to the study of contractual terms.

limit the contract by restricting flexibility through a cap on simultaneous exercise of options, by charging a fee for reservations, or by bundling other services, which effectively increases the price paid.

Hotels and intermediaries with low market power are more likely to consider variations of the contract forms that will be mutually beneficial in dealing with each other. Promising a lower price for rooms can be exchanged for a firmer guarantee of taking capacity and paying for it, as in a pre-paid contract. This will provide security to the hotel by reducing demand uncertainty and benefit the intermediary by securing capacity or reducing supply uncertainty. This can be amplified by a time-sharing contract extending the committed period to thirty years.

Contract markets

One of the most striking features of the agriculture industry is the resolution of the uncertainty attached to supply, given a relatively predictable and stable demand. (In contrast, note that in travel and tourism it is the supply that is predictable and stable, while the demand is subject to unpredictable variation.) Suppliers' uncertainty as to price fluctuations, and the impact on their welfare, fueled the institution of forward and later futures markets. A key element is the substitutability of products traded in the markets, based on a (government) certified grade of product.

Although a production unit of a commodity such as wheat may not be as truly indistinguishable as a unit of copper, and climate conditions may affect the date of delivery, the futures contract design permits enough flexibility to satisfy the realities of the industry while working to reduce the impact of uncertainty. The agreed substitution of lower grades under the stipulated adjustments is effective. The bond futures market amplifies the range seen in agricultural contracts (varying by delivery month and adjusted by grade) in order to cover the alternative instruments that can be used to satisfy the contract, leading to the concept of "cheapest to deliver" and to the impact of this on contract price. The markets in government bonds are then used to hedge interest rate uncertainty that affects all fixed income instruments, with correlated shifts accounted for in the hedging formulas.

The primary implication for tourism of the commodity and financial futures markets is that despite the non-homogeneity of the underlying products, contract design can make a forward or futures market effective in reducing supplier uncertainty. This suggests that a forward market between suppliers and intermediaries

of travel and tourism products may well be beneficial in spreading risk more efficiently. Hence the existing commitments seen as forward contracts are justified. An intermediary who has agreed to an allotment⁶ of hotel or airline capacity is relying upon the relative substitutability of rooms and seats, across suppliers and proximate time periods, to justify taking the capacity and demand risk from the suppliers. Greater access to demand and ability to create a portfolio of assets (again in time and space) enable this risk sharing to be mutually beneficial.

Further implications concern the possibility of increasing the liquidity of the existing forward market. Commodity and financial markets evolved from individual forward contracts between grower and miller, or between financial institutions and counterparts, resulting in organized futures exchanges; analogously, one can envisage a formal liquid market with differing delivery months, grades of product, and routes for airline seats and locations for hotel rooms. It is neither possible nor necessary to cover all locations and routes, nor need all grades be covered. As is the case for the fixed income markets, representative standard locations (e.g. Hong Kong, Bangkok) and routes (Los Angeles-Hong Kong, London-Bangkok) would parallel bonds or money market instruments by different maturity and issuer. These would serve to cover the basic tourism demand uncertainty and allow hedging via swapping, or experience-based premiums and discounts for underlying products. (If this should appear unrealistic, it is worth considering the recent proposal for “terrorism futures.”) In addition, a reliable and enforced certification program would be needed to establish grades of service and avoid adverse selection problems.

Beyond the more immediate extension of existing, informal forward contracts to standardized futures, the alternatives of standardized options and swaps between larger intermediaries should also be considered. The fundamental issues involved in these derivative markets include uncertainty and desire to hedge the risk exposure, variability of supply, demand or both influenced by economic and political events, need for liquidity, the existence of speculators willing to provide that liquidity, default risks, and representative instruments on which contracts can be designed. All of these features apply to the travel and tourism industry.

⁶ The term “allotment” is used in the travel industry to refer to the allocation of hotel capacity to an agent on a reservation basis. This report use the term more loosely for both option and forward terms.

6. Analytical Approaches to Capacity Allocation

The types of contracts that are available between hotel operators and travel intermediaries can be described as pre-sold allotments, free sale arrangements and walk-in sales. Under the pre-sold allotment label, an agent will guarantee to purchase a certain number of rooms for a period of time; in practice, this could be for an extended period such as two years or more, or for a portion of the year. Hoteliers typically would prefer to sell the lower demand periods and retain the high, and especially peak, periods for walk-in sales, but usually will sacrifice the profits on the latter to ensure cash flow during low season. The price is not in fact pre-paid, but is paid by an initial deposit with regular payments following; timing is not an issue except in periods of high interest rates, so the essential issue is the guarantee of accepting supply to the agent and demand to the provider. The contract may be voided by force majeure. Time-sharing contracts that would permit space to be taken at the reservation time of the intermediary are included here, although they have option aspects with respect to value and exercise.

Free sale arrangements are classified as any case where the intermediary is authorized to sell capacity on the behalf of the hotelier, acting as an agent and receiving profits through mark-up. The term allotment is often used to denote the reservation of capacity for subsequent sale by the intermediary; if the capacity is not accepted by a cut-off date, it is released to the hotel for other sale. Since there is no guarantee and these allotments are usually granted to larger intermediaries at no cost, in the expectation of yielding sales, these are treated as free sales. Walk-in sales refers to any sale made directly between the hotel and the client, whether the latter actually “walks in” or reserves by telephone or internet. The contracts used in the model assume enforcement of their terms; the exploitation of market power by large intermediaries to escape application of the precise terms cannot be accommodated in the model, except by reducing expected benefits by the option values of escape clauses or practices.

The hotelier’s allocation

A formal model for allocating existing capacity in a hotel can be modeled initially by considering the classical approach to capacity utilization, specifically a linear

programming formulation.⁷ In a variation of a “knapsack” problem, this would be for each period a single capacity constraint with an objective function of maximizing the expected revenues. Three types of activities exist, namely allotment sales, free sales and walk-in sales. The simplicity of this basic model would lead to allocating all capacity to the activity that promises the highest expected return per unit. An immediate refinement would be that each activity has only a probability of payoff and a probable use of capacity, as well as considering the constraints imposed by inter-period links. Assuming that the expected revenue is calculated as the contract price times the probability of fulfilling the sale, the modification would be to weight each capacity unit by the probability. This would still lead to degenerate solutions of a single optimal activity. This is illustrated by the following model.

Let: A = no. of allotted units

P_A = revenue from an allotment unit

Y_A = probability of sale of an allotment unit

F = no. of free sale units

P_F = revenue from a free sale unit

Y_F = probability of sale of a free sale unit

W = no. of walk-in units

P_W = revenue from a walk-in unit

Y_W = probability of sale of a walk-in unit

C = total capacity in units

The basic model is the following linear program (LP):

maximize

$$\text{Total revenue} = AP_A + FP_F + WP_W$$

$$\text{subject to } A + F + W \leq C$$

which has the solution with highest revenue (probably P_W , leading to $W P_W$ in value).

With uncertain fulfillment of the contracted sales, the LP becomes:

maximize

⁷ The solution presented here is illustrative of the approach; note that the formulation is described as being primarily degenerate until enough real characteristics of the problem are added.

$$\text{Total expected revenue} = AP_A Y_A + FP_F Y_F + WP_W Y_W$$

$$\text{subject to } AY_A + FY_F + WY_W \leq C$$

which still has the solution with highest revenue (as the ratio of $P_W Y_W$ to Y_W is again P_W , leading to $W P_W Y_W$ in value), or a degenerate solution.

In order to capture some of the uncertainty effects, the next step is to consider that different contracts of each of the first two types can be constructed, having higher and lower prices relative to probability of fulfillment. (For example, an agent who offers to take a lower priced allotment is likely to sell more units than one with a higher price; yet this is not necessarily true.) This would also cover time-sharing contracts. We could then enhance the allotment activities by four types representing alternative agents, as follows:

| Type | contract revenue | probability of sale |
|------|------------------|---------------------|
| A1 | P_{A1} | Y_{A1} |
| A2 | P_{A2} | Y_{A2} |
| A3 | P_{A3} | Y_{A3} |
| A4 | P_{A4} | Y_{A4} |

For simplicity, assume:

$$P_{A1} = P_{A3} > P_{A2} = P_{A4}$$

$$\text{and } Y_{A1} = Y_{A4} < Y_{A2} = Y_{A3}$$

which makes A1 and A2 potentially competitive, while A3 is dominant and A4 is dominated. Then assume a parallel set of types and relationships for free sales ($F1, \dots, F4$), while W remains as a unique type.

With varying contract features, the LP becomes
maximize

$$\text{Total expected revenue} = \sum_1^4 [A_j P_{A_j} Y_{A_j} + F_j P_{F_j} Y_{F_j}] + WP_W Y_W$$

$$\text{subject to } \sum_1^4 [A_j Y_{A_j} + F_j Y_{F_j}] + WY_W \leq KC$$

where now a constant K has been added to C to represent the underselling of capacity to reflect the possible occurrence of sales above the expected level under contracts, or the alternative of over-selling capacity. Despite all these refinements, the LP still has a degenerate solution at the highest ratio of return to capacity use.

As presented, the problem is a single-period formulation. On a seasonal basis, the parameters P_{A_j} and Y_{A_j} and corresponding P_{F_j} , Y_{A_j} , P_{W_j} and Y_{W_j} would all vary,

adding subscripts (e.g. $Y_{A_{jt}}$) to all. As well, the terms of allotment contracts would generally link the solution values A_{jt} for many consecutive periods t . This results in the addition of constraints ensuring $A_{j,t} = A_{j,t+1} = \dots = A_{j,T}$; these appear as a series of constraints $A_{j,t} - A_{j,t+1} = 1$. These constraints, however, do not capture the flexibility features of actual contracts, allowing inter-periodic transfers. The result is a structured linear program with diagonal sub-matrices or blocks and simple linking segments; these structured programs are amenable to efficient solution procedures.

In order to make this approach useful and overcome the degeneracy problem, two more features must be added. The first would be to add bounds on any or all of the variables that would reflect perhaps experience as to the maximum possible sales under a contract type, maximum willingness to commit capacity to any single agent, a requirement to have a minimum sold under one form or another (for instance, a minimum of pre-allotted units to provide assurance of covering overhead). This would immediately change the solution to a non-degenerate form. In addition, shadow pricing would provide valuable information as to the economic consequences of imposing such constraints; it should be noted that shadow pricing is usually the most important product of a linear programming analysis, especially in an economic context.

The second feature adds a dimension that conveys the most important aspect of the capacity allocation decision with uncertain demand. In place of the linear objective function, the correct replacement is a quadratic function that captures the risk aspect. As for investment portfolio optimization routines (mean-variance analysis), the quadratic objective function represents a risk-adjusted objective, which is expressed by $E(R) - \frac{1}{2} k \text{Var}(R)$. The effect of this modification is firstly that expected value estimates are not sufficient, so that variance and covariance estimates must be obtained. The second result is that portfolio effects are obtained. Risk-spreading that reduces the portfolio variance without decreasing the expected return leads to superior allocation of capacity between alternative agents. Note that this can lead to removal of some of the secondary constraints in the linear formulation, inserted to achieve diversification effects on an ad hoc basis. Again, shadow pricing information can be obtained from any constraints that are imposed, which leads to evaluation of the importance of the constraints.

Due to the implications for data gathering and for complexity of solution methods with quadratic programming, alternatives exist in the same spirit. Loss

avoidance objectives are often formulated in portfolio theory and allocation models. These lead to more subjective results based on parameter estimates. Another alternative is chance-constrained programming. Also, it is important to consider the replacement of expected revenues for each activity with certainty equivalents (CE). The impact of using the CE, however, is to return to a linear structure that would require additional constraints to avoid a degenerate solution based on the highest CE. An obvious constraint is one that links relatively certain sales under allotment to overhead and variable costs; that is, the combination of allotment sales should cover the total overhead (FC) and variable operating costs (VC) associated with those sales. Such a constraint would appear as:

$$\sum_1^4 CE[A_j P_{A_j}] \geq FC + \sum_1^4 CE[A_j VC_{A_j}] \quad \text{or} \quad \sum_1^4 CE[A_j (P_{A_j} - VC_{A_j})] \geq FC$$

where the requirement to cover FC could be proportionately reduced as a policy choice. One should recall, however, that CEs are linked in theory to portfolio diversification principles in investment; financial market conditions would not apply to a hotelier's decision.

Inputs required for the model include distributional estimates for demand quantities and price predictions, as well as cost information presumed to be easily determined. Assuming a normal demand curve for most periods, the quantities are then contingent on the prices set by the hotelier. Essentially, these prices must be the set by reference to experience. Both own data and information on competitors' actions must be considered, as well as TAT data on aggregate demand; the resulting price then must rely on conventional approaches to establishing a competitive but profitable rate. Recent experience indicates that cutting prices to attempt to attract demand that has been curtailed by negative factors (SARS, terrorism, etc.) is counter-productive; lower prices may send signals of lower quality or a reduction in the expected enjoyment from the rental. Offers of complimentary services or added packed features lead to higher profits and maintenance of reputation, while retaining margins. Finally, the price must be a competitive one for the segment of the market that the hotel is designed to attract. Elasticity occurs around the market-clearing price, so that larger price increases or cuts probably cause informational problems as to the correct market segment identification.

One factor overlooked by this analysis is the secondary effect on free sales and walk-in sales of allotted capacity. Other issues that can be addressed by the hotel,

given the seasonal nature of demand, are enhancement of the value of low season capacity by packaging, and whether to “mothball” capacity in low season. The first issue is basically a capital budgeting decision, in that the addition of other features to the standard room will involve an entry cost – whether high due to construction of additional facilities, or low due to effort of arrangements with other suppliers to combine services in a package. “Mothballing” also involves a fixed cost, which may be analyzed again by capital budgeting, but may involve a real options or decision tree approach. A further issue is the option to expand capacity in the face of rising demand or insufficient capacity. This also has been addressed by real options and decision tree analysis.

The intermediary’s allocation

In contrast to the supplier, a travel intermediary faces two uncertainties – those of supply and those of demand. The intermediary is again concerned with maximizing revenues through a number of contracts with various suppliers permitting mark-up and sale to clients, these latter having a reasonably predictable demand distribution. The only capacity issue is the intermediary’s ability to obtain capacity by allotment and free sale. The issues discussed above suggest that the intermediary enjoys greater access to clients than individual suppliers would. This implies that the intermediary has a higher capacity for the risk of unfilled demand. The hotel has a fixed supply, which then translates into a pre-determined break-even point, after having made an initial scale decision that risks loss of sales; the intermediary, on the other hand, has the added flexibility of contracting for a fixed supply through allotments but retaining the opportunity to sell additional capacity when required and available. The comparable elements include the amount of committed capacity on an annual or even seasonal capacity (in contrast to the hotelier’s infrequent decision to change scale and at higher fixed cost), the option of identifying free capacity and selling it on incremental demand (similar to the hotel case), the risk of having no source of supply for identified demand (analogous to the capacity restriction of the hotel, but instead adjustable by contract terms over time), and access to a potentially vast market by website and internet advertising (at a cost that may be excessive for smaller hotels).

The fundamental decision to be resolved by the intermediary is the amount of capacity to control by firm allotments, as a percentage of the total predicted volume of business. In principle, this decision hinges on an expected value trade-off between the

profit margins anticipated from allotment versus free sales and the expected losses from unsold allotments. To illustrate the approach to determining this result, let:

A = no. of allotted units

C_A = cost of an allotment unit

R_A = sales revenue from an allotment unit

F = no. of free sale units

C_F = cost of a free sale unit

R_F = sales revenue from a free sale unit = $R_A = R$

D = demand for units

$G(D)$ = probability distribution of demand D

$H(F | D)$ = conditional probability of available free sales given demand

The intermediary will receive $(D R - A C_A)$ if demand is below the allotted units ($D < A$). If demand exceeds the allotted amount, the intermediary receives $(A + F) R - (A C_A + F C_F)$, where demand is lost if free sales fail to cover the difference ($F < D - A$). The intermediary's objective is to choose A (firm allotment contracts) to maximize,

total expected revenue =

$$\int_0^A (DR_A - AC_A) dG(D) + \int_A^\infty \int_0^{D-A} [A(R - C_A) + F(R - C_F)] dH(F|D) dG(D)$$

which can further be complicated by risk aspects as well as demand curve adjustments. This single objective is repeated for different market segments (class and location) and for different periods with varying demand curves, as well as requiring linkage between periods for allotments that span them. The key problem in addressing this is to obtain good estimates of the demand curves. At this point, there enter various marketing and contractual issues, which the intermediary must consider.

◆ **price elasticity** – using experience and market knowledge, the intermediary must ascertain the effects of marginal changes in price on demand during each season. Peak season price can depend on extracting the ultimate of consumer surplus, charging any price close to the highest available in each class of room, with virtually no price sensitivity. At the other extreme, clients engage in online comparison shopping and the slightest discounts produce significant increase in demand.

◆ **reputation** – posting prices on a website reveals to competitors and clients the degree of discounting, leading to either competition or loss of supply by hoteliers who consider the action as bad for business, and the memory of bargain prices by the

clients. Effective price reduction by giving bonuses including free package features (cruises, transfers, meals) or free additional nights is preferred, as the nominal price remains high and, more importantly a minimum revenue is retained.

◆ **marginal costs** – once the intermediary has obtained a firm allotment of capacity, it is technically free to charge as much or little as it likes; generally, a hotelier will not be sympathetic to a client's request, passed through the intermediary, to discount and will refuse to do so, as noted above under reputational effects, despite marginal benefits. The intermediary has near zero marginal costs, except for administrative expenses, in selling to a client any units of a firm allotment. Hence, any positive price is beneficial, before longer-term reputational consequences.

◆ **embedded options** – contracts that allow forgiveness of commitments have put options in them; contracts that guarantee purchase of a fixed number of nights/rooms but allow exchanges of periods or choice of periods have (flexibility) call options in them; contracts that require a fixed payment which constitutes a minimum guarantee of firm payment, as well as those in which a fee is paid to obtain a reservation allotment, are effectively options with a premium paid for the right to ensure supply; time-sharing contracts for unspecified timing of the rental period are multiple option contracts. Each of these contracts requires analysis to determine its value before a price is set.

◆ **portfolio effects** – risk aspects of the choice of contract are reduced by the ability to engage in contracts of different types (firm allotments, time-shares, free sales) with different suppliers and use these over different periods with independent clients.

Intermediaries also should access TAT data and their own records to estimate the demand distributions. In addition, experience from attempts at price variation helps to establish the shape of the demand curves for different periods or seasons. Measurement of recorded sales and rejected sales due to lack of supply will provide a basis for establishing the number of allotments to contract for. The decision, however, also depends upon whether revenue, profit, rate of return or sales volume is the short-term objective. The following simple approach illustrates the process of analysis.

The tables below show estimates of the demands at alternative prices (two points of the demand curve) for four seasons. If the conventional response to risk suggests that a 30% profit margin is required, then the left hand table indicates that the intermediary would need to commit to purchase at 1000B per night for a year in

order to reach the desired profits. The right hand table shows the effect of cutting prices in order to increase the chances of sales; in this case, a price of 1100B would yield a similar profit margin. The inputs to the tables would have to be rigorously determined in practice. As well as varying the assumed demand curves, a simulation of the alternative results under variations from the “first moment” result will help to capture risk and sensitivity.

| Season | Days | Revenue | Occupancy | Exp'd(Rev) | Season | Days | Revenue | Occupancy | Exp'd(Rev) |
|---------|------|---------|-----------|------------|---------|------|---------|-----------|------------|
| Peak | 30 | 6000 | 0.8 | 144000 | Peak | 30 | 5500 | 0.9 | 148500 |
| High | 60 | 4500 | 0.75 | 202500 | High | 60 | 4200 | 0.85 | 214200 |
| Medium | 60 | 2500 | 0.5 | 75000 | Medium | 60 | 2300 | 0.6 | 82800 |
| Low | 215 | 1200 | 0.2 | 51600 | Low | 215 | 1000 | 0.4 | 86000 |
| Average | 365 | 1296.16 | | 473100 | Average | 365 | 1456.16 | | 531500 |

| Contract | | | Cost | Profit | Margin | Contract | | | Cost | Profit | Margin |
|----------|-----|---|--------|--------|--------|----------|-----|---|--------|--------|--------|
| 1300 | 365 | 1 | 474500 | -1400 | -0.30% | 1400 | 365 | 1 | 511000 | 20500 | 4.01% |
| 1200 | 365 | 1 | 438000 | 35100 | 8.01% | 1300 | 365 | 1 | 474500 | 57000 | 12.01% |
| 1100 | 365 | 1 | 401500 | 71600 | 17.83% | 1200 | 365 | 1 | 438000 | 93500 | 21.35% |
| 1000 | 365 | 1 | 365000 | 108100 | 29.62% | 1100 | 365 | 1 | 401500 | 130000 | 32.38% |

7. Summary

The problem faced by the operators of tourist facilities is primarily that of demand uncertainty based on random factors exacerbated by insufficient information. As a result, the suppliers of capacity are held hostage by large intermediaries having greater access to this information and greater potential to process it. Large international hotel chains have overcome this problem by virtue of their scale and ability to deal directly with clients and analyze their own data. The details of the market structure in the industry, as described above, create powerful incentives to under-price the product. Forward sales of capacity through commitments are made at contract prices that surrender much of the potential profits through consumer surplus.

For independent local hotel operators, even of moderate size, lack of direct marketing potential and the risk associated with a lack of guaranteed sales force them to sacrifice profits to the intermediaries. The major problem for hotel operators is the over-capacity in all but peak seasons that reinforces the market power of large intermediaries enjoying oligopsony benefits.

The creation of a more liquid market for contracts in future sales would serve to hedge demand uncertainty and retain more of the profits in the hands of the operators. Similar constructions in other industries have served to eliminate much of the informational frictions that allow intermediaries to offer value-adding services besides the simple transactional functions. The creation of formal markets in standardized tourism units, analogous to commodity and financial futures markets, would be a major step; yet this is unlikely to be a short-term development, and would also require centralized support for an international project.

As a more immediate solution to the value transfer problem, the development of one or more online intermediaries to serve the interests of the domestic hotel operators offers a number of promising benefits as well as being a relatively low-cost and rapidly achievable approach. It also is a purely private sector initiative, which if undertaken by Thai entrepreneurs, would result in a greater domestic retention of revenues generated by the industry, of the estimated seventy percent that is believed to be lost to foreign interests. Besides offering a profitable line of business to the intermediaries, it is to be expected that some share of value would be captured by the actual capacity suppliers themselves. Some of the benefits would be obtained through exploitation of the databases that would be maintained by an online intermediary. Two avenues for improving tourism profits are analytical solutions to capacity utilization using statistical output and development of demand balancing packages by analysis of unique capacity aspects and of demand characteristics.

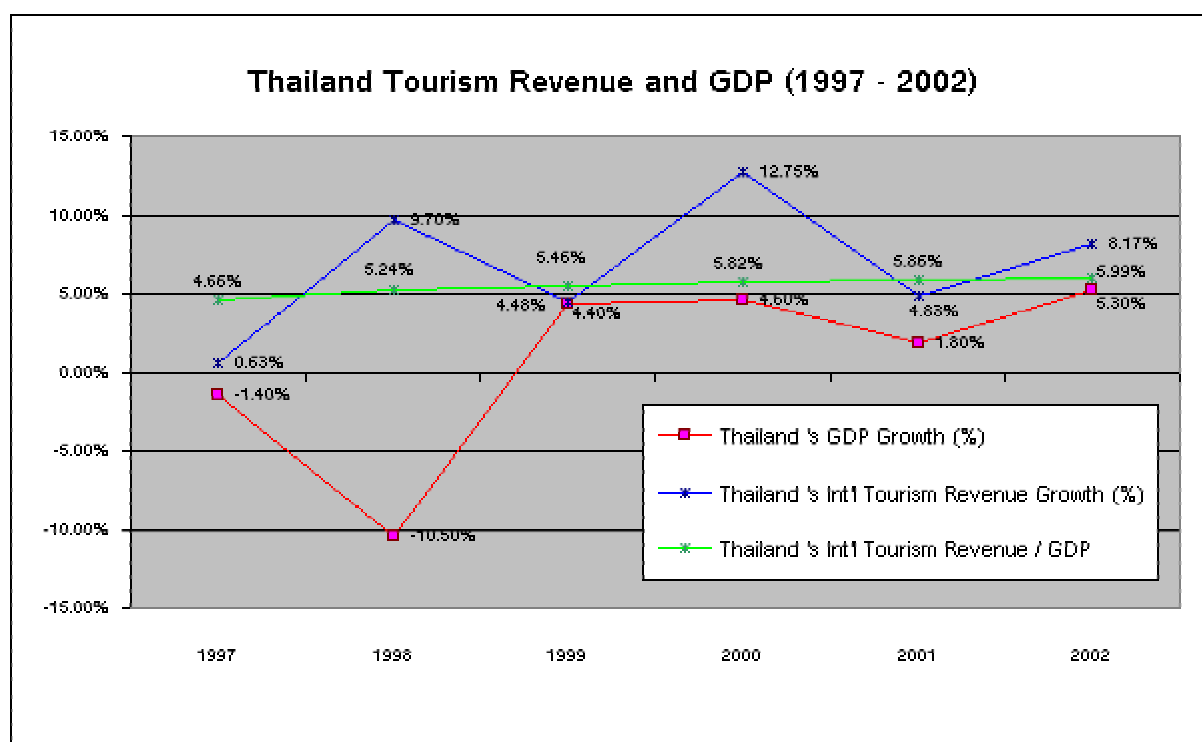
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Appendix A: Tourism Statistics

Thailand Tourism Revenue and GDP (1997 - 2002)

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--|---------|---------|---------|---------|---------|---------|
| Thailand 's GDP (Trn B) | 4.733 | 4.626 | 4.632 | 4.905 | 5.101 | 5.4 |
| Thailand 's GDP Growth (%) | -1.40% | -10.50% | 4.40% | 4.60% | 1.80% | 5.30% |
| Thailand 's Int'l Tourism Revenue (ml \$B) | 220,754 | 242,177 | 253,018 | 285,272 | 299,047 | 323,484 |
| Thailand 's Int'l Tourism Revenue Growth (%) | 0.63% | 9.70% | 4.48% | 12.75% | 4.83% | 8.17% |
| Thailand 's Int'l Tourism Revenue / GDP | 4.66% | 5.24% | 5.46% | 5.82% | 5.86% | 5.99% |



Source : Japan Centre for International Finance

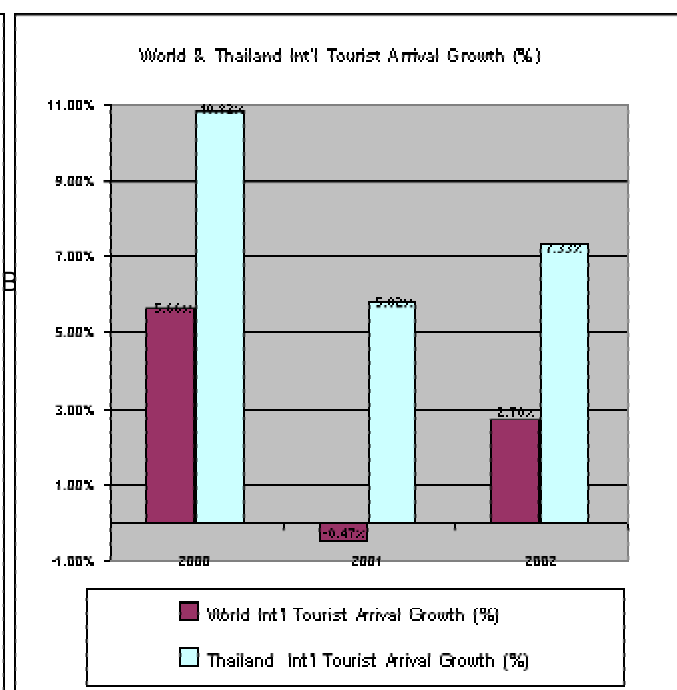
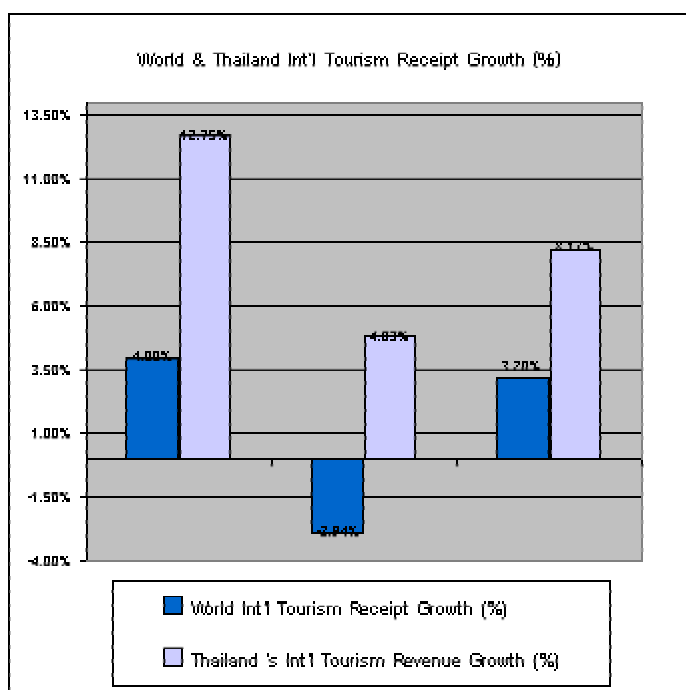
The Economist

Tourism Authority of Thailand

as of 11/25/2003

Thailand Tourism Revenue and Global Revenue (2000 - 2002)

| | 1999 | 2000 | 2001 | 2002 |
|--|---------|--------|--------|--------|
| World Int'l Tourist Arrival (ml) | 650.5 | 687.3 | 684.1 | 702.6 |
| World Int'l Tourist Arrival Growth (%) | | 5.66% | -0.47% | 2.70% |
| Thailand Int'l Tourist Arrival (ml) | 8.58 | 9.51 | 10.06 | 10.8 |
| Thailand Int'l Tourist Arrival Growth (%) | 10.50% | 10.82% | 5.82% | 7.33% |
| World Int'l Tourism Receipt (bl US\$) | 455.2 | 473.4 | 459.5 | 474.2 |
| World Int'l Tourism Receipt (bl \$B) | 0 | 18,936 | 18,380 | 18,968 |
| World Int'l Tourism Receipt Growth (%) | | 4.00% | -2.94% | 3.20% |
| Thailand 's Int'l Tourism Revenue (bl \$B) | 253,018 | 285.27 | 299.04 | 323.48 |
| Thailand 's Int'l Tourism Revenue Growth (%) | 4.48% | 12.75% | 4.83% | 8.17% |



Source : Tourism Authority of Thailand

World Tourism Organization

as of 11/25/2003

Appendix B: Travel Industry Chain

