

# A Review of Research on Information Technology in the Hospitality Industry

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## Abstract

This paper reviews recent research on information technology in the hospitality industry. The analysis revealed three broad research areas: the Internet's effects on distribution; on pricing; and on consumer interactions. Similar to aftermath of the dot com boom, the hospitality industry is realising that information technology has unintended effects and prognosticators are often wrong. While the reviewed articles provide sound advice for hospitality operators and a rich stream of future research for academics, poor rigor and a lack of relevance throughout the reviewed journals underscore a worrying trend in hospitality research.

## Introduction

Information systems form a fascinating and rapidly expanding field of study. Hospitality traditionally lags other sectors in adopting information technology (Buick, 2003) but this has changed in recent years and research into its application has followed suit. This paper represents our analysis of the information technology themes that emerged in a dozen hospitality and tourism journals: *Annals of Tourism Research*, *Cornell Quarterly*, *Information Technology in Tourism*, *International Journal of Contemporary Hospitality Management*, *International Journal of Hospitality Management*, *Journal of Hospitality and Leisure Marketing*, *Journal of Travel and Tourism Marketing*, *Journal of Travel Research*, *Journal of Vacation Marketing*, *Tourism and Hospitality Research*, *Tourism Management*, and *Tourism*

*Review.* We reviewed their tables of contents from January 2003 to July 2004 and selected articles touching on information technology and hospitality. While by no means comprehensive, this systematic approach focused on peer reviewed publications and provides a useful overview of current information technology themes and active researchers.

## **Information Technology and Distribution**

### **Electronic Distribution**

Developments in electronic distribution are the most recurrent theme throughout the period under review, reflecting topical developments since it has changed how people book hotel rooms. Two articles provide useful overviews. Carroll & Siguaw (2003) describe the major players involved in distribution, and highlight how economic issues are forcing hotels to provide increasing amounts of inventory to third party intermediaries. Using economies of scale and scope, the latter are gradually gaining control over both the sale of the hotel product and the selling price. In particular, Carroll and Siguaw highlight the growth of the “merchant model”, which changes the relationship between intermediary and supplier. Unlike commission based models, with the merchant model intermediaries determine the selling price by adding a margin to discounted rates given to them by hotels. This lack of control is problematic given the ease with which consumers can compare rates on the Web. Carroll and Siguaw maintain that the adoption of the merchant model has pressured rates downwards, thus softening hotel profitability and making hotels more dependent on intermediaries in the future. They stress using merchant channels selectively to avoid commoditisation, drafting terms and conditions carefully to effectively fence rates, and that hotels need to strive to drive business to their own websites.

O'Connor and Picolli (2003) follow a similar theme in their retrospective on Emmer et al's classic 1993 article *Marketing Hotels Using Global Distribution Systems*. They highlight the strategic threat posed by online intermediaries, the dangers of over-reliance on the merchant model, the need to develop a logical pricing strategy and the need to drive customers to direct websites to help regain ownership of the shopping experience and to gather valuable customer data. They council hoteliers to rethink their approach to distribution. Currently most use a *shelf space approach* –

being present on as many channels as possible – in the mistaken belief that more is better. They fail to realise that as the number of channels increases, so too does the complexity of the infrastructure needed to support them. A good strategy involves knowing what channels to include – a theme returned to by O’Connor and Frew (2004) below. They also emphasise customer ownership as a key strategic issue. Online intermediaries attract consumers based on their convenience, rich feature set and highly competitive prices. Supplier sites cannot compete on these dimensions and instead need to leverage their customer relationships to build and retain loyalty. They suggest that by using sophisticated CRM techniques, hotels can combat the online intermediaries. By developing close customer relationships, they reduce the danger of substitution, thus helping to insure long term profitability.

Dale (2004) provides an analysis explaining why electronic distribution has become so complex. Using strategic network theory, he shows how electronic intermediaries need to form strategic alliances in order to prosper. In a competitive business environment, independently developing the competences and capabilities to insure success is a massive task, so companies enter into stable inter-organisational relationships (for example, strategic alliances, joint ventures and long terms supplier relationships) to leverage the capabilities of partners. Dale maintains that establishing such virtual clusters leads to “synergistic strategic value”, with each partner reciprocally and mutually benefiting from the relationship, generating inimitable and non-substitutable network resources. This synergy helps offset the newness of the firm and helps compete with more established players.

Dale identifies five categories of relationships: *Channel*, which enables one company to access the distribution channels of another; *Collaborative*, where competitors cooperate with each other to achieve goals that would be difficult in isolation; *Communicative*, where content from intermediaries enriches and adds value to partner websites; *Complementary*, where companies cross sell products normally bought together (e.g. flights and hotel rooms); and *Converse*, where the partners distribute unrelated products, thus allowing each one to access the distribution channels of the other in a non-threatening manner. He highlights how this framework explains current developments in travel, where intermediaries have created a large number of networks, with each partner gaining from the competitive advantage this brings. He

speculates that competition in the future will be dictated more by the network of partners as a whole than by a single intermediary, and advises firms to participate in such networks unless they want to be left at a competitive disadvantage.

Given that electronic distribution is likely to grow more complex, how can suppliers decide which of the growing range of channels to use? O'Connor and Frew (2004) address this issue by developing an evaluation methodology for electronic channels of distribution. Having reviewed literature on the evaluation of technology projects, they argue that existing approaches have major limitations. They thus use a Delphi study to develop and prioritise a portfolio of factors for use in channel adoption and continued use decisions. In contrast to contemporary literature, which stresses evaluating projects on strategic, financial and marketing criteria, their findings suggest that technical and operational factors should drive the evaluation process. While the decision to continue using a particular channel is more multifaceted, technological and operational issues remain at the fore, suggesting that performance should be the key determinant. The study highlights the complex nature of such evaluations, as well as how the increasingly complex environment makes the use of formal methodology important.

### **Disintermediation**

Several articles address a common Internet prediction, disintermediation. For example, Tse (2003) highlights how direct web distribution may affect the relationship between travel agents and hotels. Most hotels increasingly emphasise direct web bookings, often wooing consumers by promising best rate guarantees or loyalty club points. Since travel agents remain an important source of business, Tse explores their potential reaction to this strategy. Building on conflict theory, he highlights two possible reactions – negative (perhaps terminating the relationship) or positive (including constructive discussion to find a win-win solution or simply passive acceptance). Theory speculates that the reaction to expect depends on several factors, including the perception of damage; the injured party's perception of relationship quality before the act in question; their perception regarding the motivation behind the act; and the level of interdependence between the two parties.

Applying this framework to the relationship between hotels and Hong Kong travel agents, Tse highlights how, since the perception of damage is high as it threatens their very survival, hotels should react negatively. However, a perception that current developments are driven by external acts (the weak economy, terrorism, SARs) rather than just greed, and the fact that agents and hotels remain highly interdependent, are identified as mitigating factors. Tse claims this helps to explain the relatively passive acceptance of hotel company strategies by travel agents.

Several papers highlight the rapidity with which the hotel industry is adopting the Web to sell directly to the customer. Garcés et al. (2004) show that the majority of Aragonese hotels have adopted ecommerce, use the Internet to advertise their services and garner between 2% and 5% of their revenues online. Similarly, Buick (2003) found high levels of both computer use and use of the Web for marketing purposes in small Scottish hotels. Vich-i-Martorell (2004) examined the potential of using the Internet to compete with tour operators. Particularly in areas dependant on mass tourism, tour operators have a high degree of control over distribution and typically dictate rates, terms and service levels to suppliers. Highlighting the potential of the Web to break this domination, he points out that continuing to procrastinate would further reduce competitiveness as industry consolidation means that suppliers will have to deal with bigger, even more powerful tour operators in the future. Summarising his research among different tourism suppliers in the Balearic Islands, Vich-i-Martorell establishes that most use ecommerce. These he categorises, using cluster analysis, into six groups – “Utopian”, “Negative”, “Passive”, “Positive”, “Fearful” and “Optimistic in theory – Indifferent in Practice”. Chain hotels feature highly in the “Utopian” group and are absent from the “Fearful” category, demonstrating their strong position in the battle with tour operators. Independent hotels, though, feature highly in the “Optimistic in theory – Indifferent in Practice” and “Fearful” groups, indicating their concerns about using the Internet as a marketing tool. Vich-i-Martorell speculates that this results from fears of a boycott by tour operators if they leverage Web distribution to compete on a more equitable footing.

## **Information Technology and Pricing**

## **Online Pricing**

Enz (2003) also addresses the issue of the networks identified by Dale (2003) above, which she claims are driving down hotel profitability. Noting that hoteliers use these networks without a clear understanding of their effect, she claims that they encourage competition based solely on price and urges a rethink of such hidden discounting. Citing forthcoming research from the *Centre for Hospitality Research* at Cornell, she shows how price has become largely transparent and that consumers now book rooms at one price, shop around for better prices and then cancel and rebook. Rather than yield higher total sales, discounting simply displaces customers from one distribution channel to another. Any increase in volume fails to offset the revenue lost from the discounting. Claiming that this is true for all industry segments, regardless of occupancy rates, Enz maintains that hoteliers need to be more selective about the rates they provide to third party sites to insure that they are actually generating incremental revenues.

Pointing out that consumers frequently search multiple channels for the cheapest price, and expect cheaper prices online, O'Connor (2003) investigates if the behaviour of chain hotel brands conforms to these expectations. Using historical data, he surveys rates across five B2C channels to establish whether pricing is consistent across channels; whether one channel is consistently cheaper; and whether the apparent pricing strategy is logical from both consumer and hotel perspectives. His findings show that hotel companies typically use multiple distribution channels, and offer multiple rates across each channel. No channel consistently offers the cheapest price, but the analysis reveals differences based on market segment. Consumers are more likely to find cheapest prices on direct channels (chain website and call centre) at the lower end of the market, and conversely through intermediaries at the upper end. In other words, luxury hotels appear to be offering their cheapest prices through channels with the highest cost of distribution. O'Connor concludes that hotel companies in general do a poor job managing their distribution, and urges them to develop well thought-out pricing policies that would encourage consumers to book through brand websites. Anecdotal evidence would seem to suggest that operators have followed this advice, as evidenced by the recent widespread use of "Best Rate Guarantees" on many hotel websites.

Litvin and Crotts (2003) focus on the potential use of online negotiation models in hospitality. While yield management varies prices relative to demand, the rate to individual customers is fixed; hotels set the price and potential guests accept their offer or stay elsewhere. In contrast, negotiation is normal with group sales (meetings, conventions, tour groups, and corporate travel accounts), and Litvin and Crotts explore the applicability of contemporary e-commerce negotiation models to group sales. They argue that the “Consumer to Computer” model, (buyers nominate a price, commit to the transaction and have their offer matched to potential suppliers) is inefficient. Only the highest bid is accepted, other potential customers are left unsatisfied and incremental revenue is lost as non-winning bids are foregone. “Online Requests for Proposal” (buyers detail their requirements, which are then forwarded to potential suppliers) help overcome these limitations, but generally only facilitate matching and have no influence over subsequent negotiations. Litvin and Crotts advocate an “Automated Business-to-Business Negotiation” model, whereby the facilitating company maintains a dynamic database of active purchase and sale intentions, which it cross-compares to seek potential transactions. Once detected, the negotiation process begins and the system attempts to bring buyers and sellers together by adding stated trade-offs as needed. As this takes place automatically, negotiation can occur simultaneously with multiple partners, increasing the likelihood of finding an appropriate deal. The authors argue that this approach is superior as it balances power differentials through matchmaking, and facilitates the entire process. Compiling a critical mass of potential buyer and seller transactions has limited the commercial success, so far, of this application.

## Hospitality Consumers and Information Technology

### **Online Consumer Decision Making**

Several articles investigate how technology influences hospitality consumer decision-making. Seeking information is one of the first stages in the decision making process. Gursoy and Umbreit (2004) use 3,264 responses from a European Commission survey to investigate cultural differences in how travellers from 15 EU countries search for information, online and offline. They found five distinct market segments and suggest

specific marketing communication campaigns for each segment. For example, travellers from Belgium and Italy use external information sources more often than other segments, while travellers from Denmark and Finland use the Internet most frequently. Marketers need therefore to align their marketing efforts with a culture's information search behaviour.

Jeong et al (2003) explore the role of online information and behavioural intention, highlighting the importance of information satisfaction. They claim that this is a powerful determinant of behavioural intentions; lodging operators must ensure that websites satisfy visitors' information needs in order to expect online transactions. Specific website elements to note include accurate and reliable information, and easy navigation. Susskind et al. (2003) investigate how apprehensiveness towards Internet use relates to information seeking, purchase intention and purchase behaviour. Drawing on three separate surveys to develop and refine two measures, General Internet Apprehensiveness (GIA) and Transactional Internet Apprehensiveness (TIA), their results support strong relationships between apprehensiveness and both online information seeking and purchase.

Card et al (2003) also investigate the purchase decision. Surveying members of the Travel and Tourism Research Association, they found that six out of seven shopped online, with airline tickets the most common purchase, followed by accommodation, travel information, rental cars, event tickets, bus or rail tickets and package tours. They found differences between shoppers and non-shoppers based on personal characteristics, with the former tending to be opinion leaders, more innovative, involved in information seeking and used to TV shopping. Their results, however, showed no differences between shoppers and non-shoppers based on perceptions of online store characteristics. Fam et al (2004) also consider online store characteristics, in particular the role of consumer trust. Their study of New Zealand online accommodation providers and consumers suggests a chasm between actual practice and consumer wants. The latter demand significantly more trust features – guarantees, refunds, company information, privacy statement and email confirmations – than websites currently provide.

## **Website Layout and Design**

To account for such differences between consumer wants and website offerings, hotels need to reflect upon their website design. However, research on effective hospitality websites is an ongoing quest. Several studies specifically examined website layout and design. The first two introduce the notion of the experience economy and suggest how Web technologies can reinforce the customer experience (Dubé, Le Bel, & Sears, 2003; Stamboulis & Skayannis, 2003). Websites, for example, should reinforce a hotel or resort's position by going beyond visual pleasures on the site and adding sensual, emotional and intellectual pleasures for online consumers (Dubé et al., 2003).

Other authors explore the practical and theoretical issues of *how* to accomplish this, investigating what features and functions hospitality operators should incorporate into their websites. For example, Jeong et al. draw upon past literature to develop six measures of website quality, namely information accuracy, clarity, completeness, ease of use, navigational quality, and colour combinations. Responses from 1,743 US respondents suggest that website quality is an important antecedent of information satisfaction, which in turn is a powerful determinant of behavioural intention. Of the quality measures proposed, ease of use shows the strongest relationships with both information satisfaction and behavioural intentions.

Chung and Law (2003) develop a performance indicator for hotel websites based on five dimensions of information richness – facilities, customer contact, reservations, surrounding area and website management. Gauging the importance of dimensions from a survey of hotel supervisors, they analyse Hong Kong Hotel Association member websites. Consistent with past research, the level of information technology application relates directly to the hotel category. Murphy et al. (2003) posit that hotels paying attention to email also pay attention to their websites. Measuring email responses and assessing the website features of Swiss hotels, they argue that hotels with professional email responses also lead in the use of websites. Based on their findings, they suggest that hoteliers focus on inexpensive features that show a significant relationship to quality email responses, such as brochure requests, online services, hyperlinks, and branded URLs. Alternatively, their results suggest that hotels avoid questionable techniques such as animation, as it may reflect a bandwagon effect

rather than add value. As in other studies, they found that hotel size and category relate directly to quality e-mail responses and the presence of appropriate website features.

### **Customer Relationship Management**

Piccoli and colleagues (2003) review the risks and benefits of customer relationship management (CRM). This philosophy of intimate customer familiarity can lower marketing expenditures and increase sales through closer relationships and increased satisfaction. For this to occur, the entire hotel chain must cooperate in the collection, management and dissemination of customer information – an expensive and complicated process. They highlight a potential data-ownership dilemma caused by the structure of the US lodging industry in which owners, management companies, and brands cooperate in the operation of properties. It is inherently difficult for these three entities to share customer data. In addition to cooperating, they frequently compete with each other, which could limit successful CRM implementation.

Piccoli et al argue that if these difficulties could be overcome, CRM would work best at the brand level, a claim supported by two case studies of brands with strong CRM programs – Wyndam International (Piccoli et al., 2003) and Harrah's Hotels and Casinos (Magnini, Honeycutt, & Hodge, 2003). The latter also exemplifies how successful CRM relies upon data mining. This procedure applies artificial intelligence and sophisticated statistical techniques to customer data to perform five tasks: classification, clustering, deviation detection, associations and forecasting, and can be a valuable tool for hotels seeking to better understand and predict guest behaviour (Magnini et al., 2003).

Two articles investigate the implementation of a CRM system. Based on qualitative and quantitative research with Italian hotel operators, Minghetti (2003) proposes a CRM system and complementary matrix for evaluating guest information, which serve as a convenient blueprint for implementing or evaluating the CRM process. Louvieris and Driver (2004) suggest how the developing XML web standard could enable the CRM process. Consumers increasingly use a variety of devices (for example cell phones, Interactive television and kiosks) to access the web, and need

different types of interactions, information and procedures depending on the relationship stage. They show how the current one-size-fits-all approach is unlikely to be successful. However providing the required personalisation to service each situation is difficult using current technology. They propose how the unique characteristics of XML, which uses content specific rather than stylistic tags, could help hotel companies implement the needed device specific and loyalty level personalisation.

Finally, three studies investigate a subset of customer relationship management, online customer service. These use similar methodologies to test Swiss hotels (Frey, Schegg, & Murphy, 2003), Tunisian hotels (Gherissi-Labben, Schegg, & Murphy, 2003), and luxury chain hotels (Schegg, Murphy, et al., 2003). Swiss hotels showed the highest e-mail response rates at 71% with Tunisian hotels at a 45% response rate performing worst. Most respondents, however, gave sloppy and inadequate replies, which suggest a lack of focus on online customer service. The authors argue that email communication is business communication and use diffusion of innovations (Rogers, 1995) as a theoretical base to investigate differences in response rates and response quality. There were no significant differences in response rates but larger, higher rated and affiliated hotels tended to provide better quality responses.

## **Conclusions**

Compiling this review of research on hospitality information technology has been for us a useful and enlightening exercise. On an individual basis, the articles considered for inclusion make a contribution, but considering the collective set of literature, two recurring issues come to light – rigor and relevance.

Similar to past commentaries on hospitality research (Johns & Pine, 2001; Lynn, 2002; Okumus 2002) this review highlighted the need for authors, editors and reviewers to endeavour to raise the quality of research in our field. Many 2003-2004 articles, particularly those deliberately omitted from this review, were weak methodologically. Several were purely descriptive. Many of the others displayed an over-reliance on the survey method, unrepresentative and convenience sampling, shallow analyses, misinterpretations of data, and a tendency to draw conclusions and

make broad generalisations without adequate evidence. With certain exceptions, contributions to theory were weak. In addition, there appears to be a lack of meta-knowledge as to what other researchers are doing, with the result that many studies replicated each other with minor difference in focus or geographical area. Few build on each other to extend knowledge. That papers dealing with hospitality IT are scarce in the leading journals in our field reflects a need to "raise the bar". Our feeling is that editors and reviewers need to improve the review process, not by rejecting articles, but by demanding more and providing constructive feedback and guidance to encourage authors to address this quality issue.

Secondly, authors should address a broader research agenda. As the above analysis illustrates, researchers are currently focusing on a limited (dare we say "fashionable") range of issues and ignoring important areas. For example, hospitality companies annually spend millions of dollars on information technology, yet few articles addressed the management of the IT resource. Similarly, there is a woeful lack of research on the use of information technology in industry segments other than hotels. For example, developments in information technology dramatically affect restaurant and food-service management, yet not a single article appeared in a high quality academic journal on the subject in the past 18 months.

Foodservice and hotels face similar IT issues, including: allocating resources; evaluating projects; and measuring how the adoption of enterprise-wide information systems affects the management and structure of hospitality companies. In our people-intensive business, how does the introduction of technology influence staff effectiveness, productivity and moral? What technological skills, if any, do employees need to take advantage of the rapidly changing technological landscape? Should management focus less on basic skills, such as good customer service, in order to bring employees up to speed technologically? We think not. Most employees are probably more adept with new technologies than their managers, but there is no empirical research to support our argument.

Although there is empirical research in our field, too much of this research is descriptive. Future hospitality research would benefit from other methodologies such as field experiments to show causality, and relying upon actual behaviour rather than

intended behaviour. There is a yawning gap between a convenience sample of respondents filling out a form saying they intend to purchase online and what hospitality consumers actually purchase online. Server log files, advertising banner click rates, email response rates, online prices and CRM databases illustrate rich data sources that measure actual behaviour by hospitality enterprises and consumers.

Reviewing the published articles also highlighted (perhaps because of the difficulty in doing it successfully) that consumer research is largely absent but desperately needed. Using the themes identified in this article as a roadmap, such studies could help clarify an important range of questions, such as what motivates a consumer to use one distribution channel rather than another. How price, convenience, website design, and website content encourage consumers to change from lookers into bookers? How effectively do frequent guest programs attract, retain and build customer loyalty? These suggestions, albeit in no way conclusive, illustrate a range of rich and interesting future research questions ripe for industry collaboration and addressing consumer behaviour issues that extend beyond the hospitality industry.

Overall, our conclusion is that research in this field – including our own – needs more originality in both the topics addressed and the research methods used. Having considered the majority of the peer-reviewed articles published on the topic this year, it seems to us that our focus is currently much too narrow and that a broader research agenda would make our work more relevant to industry practitioners. And we, as researchers, need to address rigor and relevancy issues if we are to advance our credibility with academic and industry colleagues.

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