

INFORMATION TECHNOLOGY PUBLICATIONS IN LEADING TOURISM JOURNALS: A STUDY OF 1985 TO 2004

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Despite the extensive range of applications and the dependence of the tourism industry on Information Technology (IT), up to the present time the existing tourism literature has only a limited number of published articles, if any, that give an overview of the progress of IT publications over the past two decades. This article reports on a study that analyzed the published IT papers in three leading research journals in tourism, and examined the trend of IT research based on the publications. Excluding book reviews, research notes, reports, commentaries, and case studies, these three journals published a total of 2,135 full-length research papers during the period 1985 to 2004. Among these full-length research papers, only 55 full-length IT-related papers were found. Moreover, IT applications were grouped into six categories. This study revealed that networking was the most widely published category and with the highest growth rate in 1995–2004. Empirical findings are also compared with the publications in the journal *Information Technology & Tourism* (ITT) and mainstream IT journals. This article contributes to review the progress of IT research that tourism researchers have performed and published over the past two decades in leading tourism journals.

Key words: Leading tourism journals; Information technology; Publications; Content analysis

Introduction

The present tourism industry has been deeply affected by advanced technological developments (Bentley, 1996). Examples of the recently developed technologies include fiber optics, broadband-enriched networks and telecommunication applications, and personal computers that are as powerful as mainframe computers in the 1980s. Addition-

ally, inexpensive removable storage media that are used as storage devices for images (still or moving) and sound are now commonplace. Due to these innovations, technology can be used effectively to connect different tourism sectors and individual consumers. Lyons (2000) commented that IT is a useful tool for the tourism industry that can match the requirements of demand and supply. As an example, serving as part of tourism products,

airline companies can broaden their ticket-selling channels by allowing travel agencies to check the availability and issue tickets through their reservation systems via the traditional CRS/GDS, as well as the recently established online distribution channels. Similarly, travelers can look for the latest travel information offered by tourism organizations via the Internet. Stipannuk (1993) stated that IT could create tourist experiences when it acts as a protector, enhancer, and a focal point. The information content that IT delivers can therefore affect tourists' behavior directly.

In relationship to tourism practitioners, business IT generally refers to the application of computing and telecommunication technologies that serve as a tool for producing products or providing services to give most benefits to customers (Kirk & Pine, 1998). Although tourism is not an IT-oriented industry, Olsen and Connolly (2000) stated that IT commences and ends with customers in tourism and hospitality, and therefore IT use can place knowledge at the core of an organization's competitiveness. In other words, it would be disadvantageous to those tourism organizations that do not keep up with technological advances that make customer service and operational efficiencies possible (Cline & Warner, 1999). Hence, IT investment has become an essential business component in tourism, as technologies play an important role in strategic and operational management. It was expected that IT would provide opportunities and challenges to the tourism industry (Buhalis, 2003). Frew (2000a) thus advocated that IT would bring about a paradigm shift in the tourism industry in the next 20 years. Because tourism education is an applied field, tourism academics believe that the findings of their research projects can offer innovative ideas that will benefit the industry, which may eventually get support from the industry (Eder & Umbreit, 1988). Hence, university faculty members have been, and will be, conducting research projects in all related areas, including IT, to help advance knowledge. The most frequent channels for disseminating research findings are either trade magazines or research journals.

As technology becomes more complicated, people will find it more difficult to choose, analyze, implement, and operate new computer systems. To get the latest technology information,

some tourism managers read trade magazines to become familiar with IT evaluations in the industry. By reading and using the applications discussed in these publications, tourism managers wish to enhance their business plans and operation procedures. While trade magazines could be of interest to some readers, the business-sponsored information revealed in these magazines could be potentially biased. Research journals, instead, are able to offer rigorously refereed and more neutral information on technology analyses and evaluations. Despite the endeavors of researchers on tourism IT, the existing literature only has a small number of publications that review the progress of IT since the early 1980s, when the tourism industry commenced its unprecedented growth (Frew, 2000b; Kirk & Pine, 1998; Kluge, 1996; O'Connor & Murphy, 2004). Baker and Riley (1994) pointed out that the literature in service industries is not capable of establishing the relationship between the use of technology and its impact on productivity. This article makes an attempt to fill in this void by analyzing the contents of IT publications in leading tourism research journals in the period 1985 to 2004.

This section has introduced the background of the study. The next section reviews the literature on academic research and publications in general and in particular on tourism IT. The section after that presents the methodology used in this study. A section on findings and analyses then follows. The last section summarizes this study, and offers suggestions for future research.

Literature Review

Research journals largely serve as a scholastic channel and indicator that reveal the direction and nature of research in a particular field. As such, these journals are the source for generating and disseminating new knowledge (Pechlaner, Zehrer, Matzler, & Abfalter, 2004; Reid & Andereck, 1989). Schmidgall and Woods (1993) performed an analysis on the ratings of different publication channels and discovered that research journals are the most important source of publications. Thus, research journals play a significant role in the process of knowledge development.

In the past 20 years, the number of research journals in tourism and hospitality has increased

significantly. As an example, there were only 24 tourism and hospitality research journals 20 years ago. However, the corresponding number increased to more than 100 in 2002 (Hsu & Yeung, 2003). Such a large increase reflects the enormous growth of tourism and hospitality industries as a field of academic study. Like other academic fields, there has been a move to rate the quality of different tourism and hospitality research journals. For instance, Pechlaner et al. (2004) evaluated 22 tourism and hospitality journals on five categories of practical relevance, scientific relevance, overall reputation, readership frequency, and the importance for career development. Other similar studies on rating tourism research journals were also performed by academic researchers (Hsu & Yeung, 2003; Schmidgall, Woods, & Rutherford, 1996; Sheldon, 1990). Law, Lam, and McKercher (2005) performed a survey with 520 scholars from 195 universities in relation to their perceived rating of 88 hospitality and tourism journals. According to all these research publications, the leading three tourism journals were: *Annals of Tourism Research* (ATR), *Journal of Travel Research* (JTR), and *Tourism Management* (TM) (Table 1). Jogaratnam, Chon, McCleary, Mena, and Yoo (2005) further reconfirmed that these are currently the leading research journals in tourism.

Recently, some scholars have performed content analyses on both tourism and hospitality journals. For instance, published articles in five research journals were examined in the period 1983 to 1989 (Baloglu & Assante, 1999) and in 1990 to 1996 (Crawford-Welch, 1992) on subject areas and research techniques. Similarly, Chon, Evans, and Sutherlin (1989) conducted a content analysis on hospitality management literature in four journals during the period 1967 to 1986. In another study, Bowen and Sparks (1998) categorized hospitality marketing into nine subcategories and ana-

lyzed the content and research methodologies from eight major hospitality journals from 1990 to the first half of 1997. Heck and Cooley (1988) argued that a review of the related literature could show the degree of maturation of the field and its contributions, which in turn could influence the perceptions within the community of leading academic institutions.

In the context of IT, Kluge (1996) reviewed the hospitality literature on IT in hospitality education. The study examined a total of 102 IT articles that were related to hospitality curriculum in seven journals. These articles were then categorized into 12 subject areas in terms of IT, curriculum development, and educational contents. Likewise, Kirk and Pine (1998) categorized IT research into six areas of IT: development, technologies, types of technologies, technology transfer, future prediction, and methodological approaches. However, the broad extent of this categorization made it impossible to analyze specific technological changes. Frew (2000a, 2000b) had conducted a comparable survey in relation to information and communications technologies from a database that analyzed the contents using 15 different keywords during 1980 to 1999. Lastly, O'Connor and Murphy (2004) analyzed the published IT articles in 12 research journals for a period of 17 months. Three main areas were used, including IT and distribution, IT and pricing, and IT and hospitality customers. Research findings, while interesting, were limited by the short period of analysis that made it difficult to draw generalized conclusions.

As a young and developing field, tourism and hospitality would certainly be benefited from having more rigorously performed research (Khan & Olsen, 1988). Nonetheless, there is seemingly no clear overview of research on IT in tourism. As previously discussed, along with the rapid development in tourism, IT will definitely bring changes to the industry. As a result, it would be worthwhile to review how IT research changes in the past two decades in leading tourism journals.

Table 1
Journal Ranking

Author (Year)	ATR	JTR	TM
Sheldon (1990)	1	3	7
Hsu and Yeung (2003)	1	3	2
Pechlaner et al. (2004)—US	2	1	6
Pechlaner et al. (2004)—Others	1	3	2
Law, Lam, and McKercher (2005)	1	3	2

Methodology

IT publications in the three leading research journals in tourism—ATR, TM, JTR—were analyzed. Publications in ITT, the specialized IT journal in tourism, and papers in different mainstream

IT journals that are related to tourism were also analyzed for comparison. Excluding book reviews, research notes, abstracts, commentaries, reports, rejoinders, and viewpoints, these three journals had published 2,135 full-length research papers from 1985 to 2004, of which 55 of them were IT related. As a comparison, since its inaugural issue in 1998, ITT had published 103 full-length IT-related research papers from 1998 to 2004. For mainstream IT journals, papers were extracted on the basis of a database search using Science Direct's online function (URL: www.sciencedirect.com) with keyword "tourism" in query terms within "Abstract, Title, Keywords," and selecting "Computer Science" and "Decision Science" as subject areas. Among the 196 included journals, 20 entries in 14 different IT journals were returned within the study period, and the Appendix lists these IT journals.

Werthner and Klein (1999) grouped technology components into four categories of networking, information management, intelligent applications, and user interface. Buhalis (2003) further confirmed the technological evolution of such a grouping. Nevertheless, these four categories only covered the technology aspects, and without the consideration of the broad spectrum of business applications. In order to make the list more inclusive, two categories including general business application (GBA) and miscellaneous (all attributes that do not fall into any one of the five categories) were also included in this study. The attributes in GBA were grouped on the basis of respective studies by Sheldon (1997) and Inkpen (1998), which included the software and applications used by the industry along with guest-operated devices. To ensure its industrial applicability, the established list was validated by a group of tourism practitioners who had extensive practical experience in tourism IT to ensure the industrial applicability. Figure 1 shows the attributes included in the final list of tourism IT categories.

Findings and Discussion

Analysis in Journals Perspective

Among the 2,135 full-length research papers that were published in the three research journals in the period 1985 to 2004, ATR published the

largest number of 827 papers, followed by TM with 696 papers, and JTR with 612 papers. In terms of the percentages of the published IT papers, TM had the highest percentage of IT papers published. Within the study period, TM published 29 IT research papers out of the 696 published full-length research papers (4.17%), which was followed by JTR with 22 IT papers from a total of 612 papers (3.59%). ATR, however, had the least proportion of IT papers published. Out of 827 research papers, only four papers were IT related (0.48%). Figure 2 provides the numbers and percentages of IT papers published in these journals.

Distribution of IT Papers

On average, tourism journals published 2.75 IT papers per year in the study period. It is interesting to note that there were 4 years with no IT papers published in the selected journals (1987, 1994, 1995, and 2001). Figure 3 shows the yearly distribution of IT papers and full-length research papers.

The number of full-length research papers in the three journals increased from 79 papers in 1985 to 150 papers in 2004. Meanwhile, the number of IT papers also increased from one paper in 1985 to nine papers in 2004. In other words, there was a growing trend in terms of the number of published IT papers. During the study period, the least productive year for full-length research papers was 1986, with 69 research papers published, and the most productive year was 2004, with 150 papers published. In terms of IT papers, the most productive years were 2000 and 2004 with 10 and 9 IT papers published. The number of published IT papers was actually growing in 1985 to 1993, but the growth dropped in 1994 and the IT publications basically remained stagnant in the following few years. A reason for this change was very likely due to the introduction of the ENTER Conference organized by the International Federation for IT and Travel & Tourism (IFITT) in 1994. As the largest international conference on tourism and IT, the ENTER Conference attracted many IT research papers from regular research journals (IFITT, 2005). Moreover, with the launch of the journal ITT in 1998 and the *International Journal of Hospitality Information Technology* in 1999,

Networking <ul style="list-style-type: none"> - ISO/OSI - Internet - SGML - World Wide Web - Hyper Text Markup Language - XML - Cryptography - GSM - WAP - ATM \leftrightarrow IPv6 - System Architectures - Client-server - Distributed and mobile computing 	Information Management <ul style="list-style-type: none"> - Database: relational, object-oriented - Multimedia - Data modeling - Data warehousing - CRM - Unified Modeling language (UML) - Programming languages - Information search - Computer Supported Cooperative Work (CSCW) - Authoring tools - Participatory design
Intelligent application <ul style="list-style-type: none"> - Artificial intelligence - Logics - Optimization - Simulation - Statistics - Knowledge discovery and data mining - Learning systems - Agents - Artificial life 	User Interface <ul style="list-style-type: none"> - What You See Is What You Get (WYSIWYG) - Multimedia - Windowing - User modeling - Natural language processing - Metaphors - Visualization - Adaptive interface
General Business Application <ul style="list-style-type: none"> - Property Management Systems (PMS) and Interface - Point-of-Sales systems (POS) - Restaurant Management systems - Call accounting systems (CAS) - In-room systems - Computerized reservation systems (CRS) - Self-Service kiosk systems - Reservation Systems - Yield Management systems - Food and Beverage systems - Back-office systems - Sales and Marketing systems - Travel Information systems - Global Distribution systems (GDS) - Tourism information systems - Destination Information systems - Video-conferencing - Telecommunication 	
Miscellaneous <ul style="list-style-type: none"> - Any topics that do not fit into one of the above five categories 	

Figure 1. Categories and attributes of tourism information technologies.

some IT research papers were published in these IT-specific journals instead of the three leading tourism journals included in this study. Figure 4 shows the yearly distribution of papers published in ITT.

Analysis of Research Categories

Table 2 presents the distribution of IT publications in the six categories. Because some research

papers covered more than one IT category as shown in Figure 1, the total count in research categories was 61 in ATR, TM, and JTR, which exceeded the total number of IT papers. According to Table 2, the most widely published research category in the study period was networking with 21 occurrences, which is followed by GBA (general business application) with 12 occurrences. Excluding miscellaneous, information management ranked third with nine occurrences and intelligent applica-

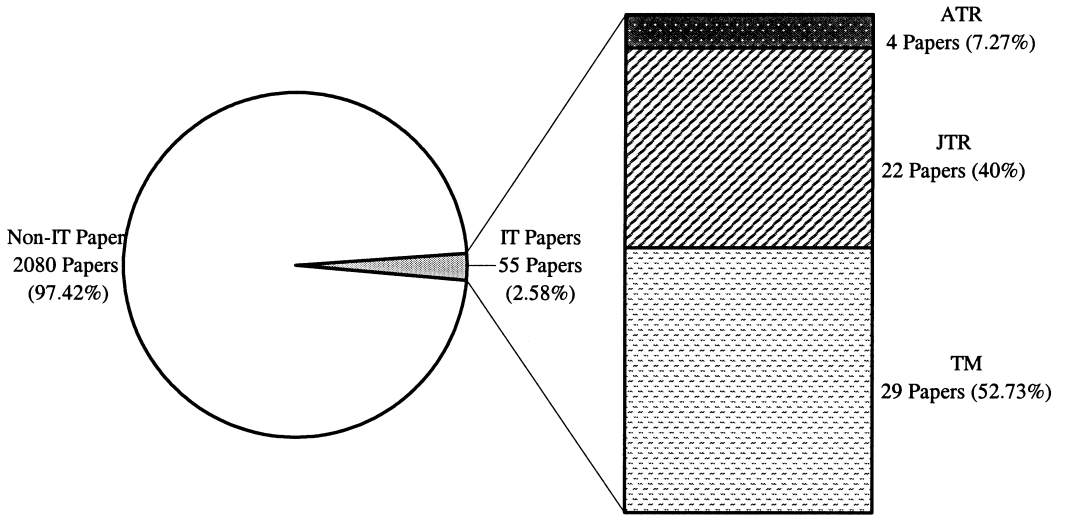


Figure 2. Distribution of IT papers in leading tourism journals.

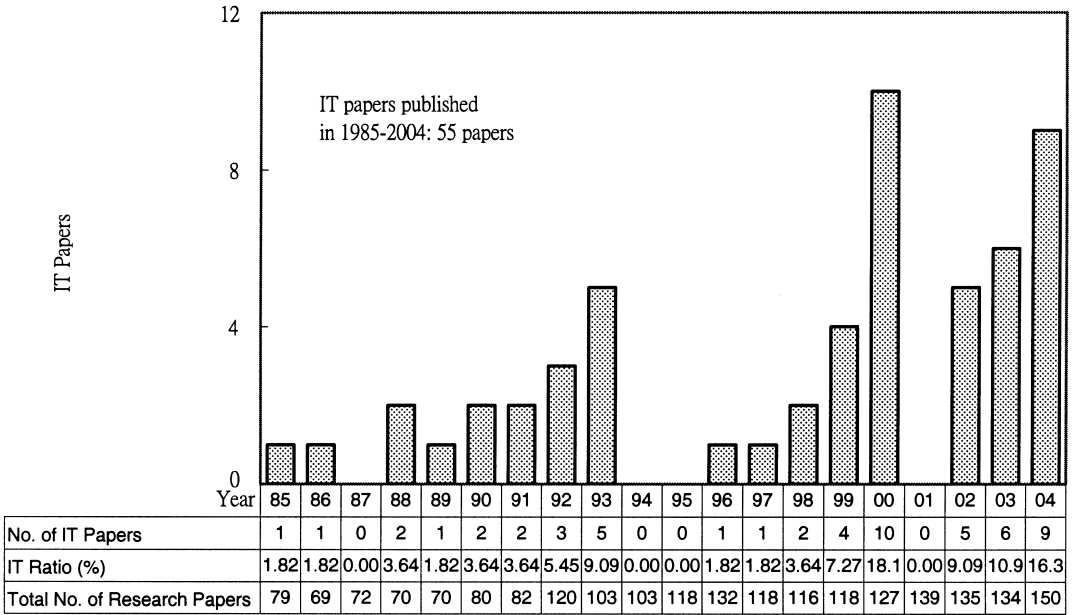


Figure 3. Distribution of IT papers in 1985–2004 in leading tourism journals.

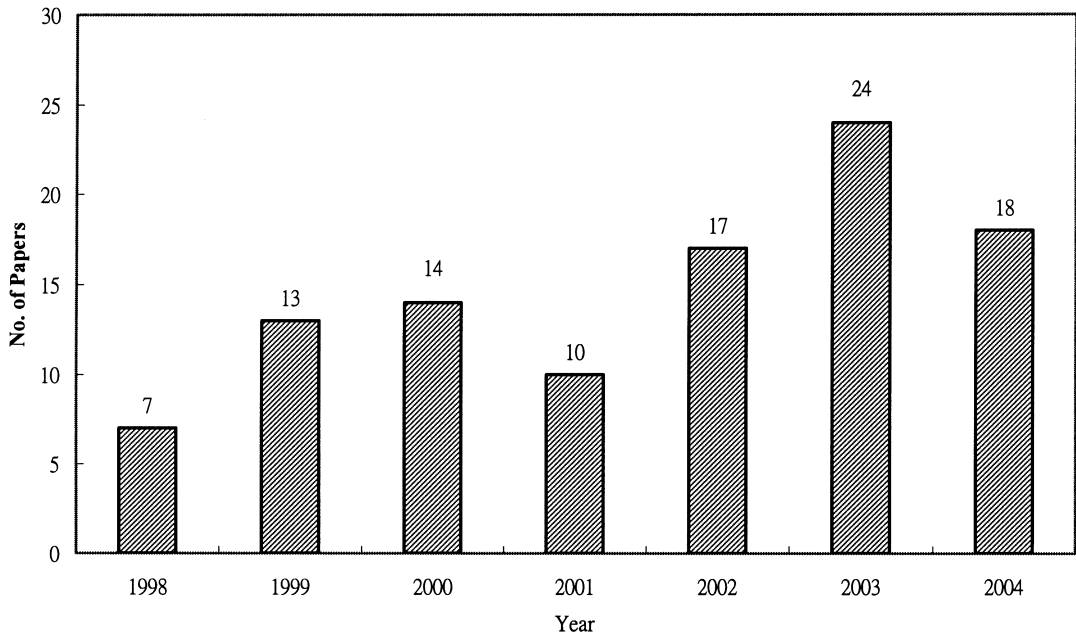


Figure 4. Yearly distribution of research categories in ITT (1998–2004).

tion ranked fourth with six occurrences. User interface was the least popular researched area with only two occurrences. In addition, 18.03% of the IT papers fell into the category of miscellaneous with 11 occurrences. In ITT, the hottest category was also networking with 42 occurrences (40.78%) but GBA was the least popular category with only two occurrences in the 7-year period (1.94%).

Analysis by Individual Journals

According to Table 2, TM and JTR published all IT papers on networking, the most widely published category. Although networking was the most popular category after 1993, ATR did not publish any papers in this area. Among the 12 GBA papers, 10 were published in TM, but JTR and ATR each published only one paper in this category. While TM and JTR produced most, if not all, of the IT publications in information management and miscellaneous categories, ATR published one third of the papers in intelligent applications. Lastly, JTR was the only journal that published all (two) papers on user interface.

Analysis by Decades

The total numbers of IT papers published in the first decade (1985 to 1994) and second decade (1995 to 2004) were 17 and 38 papers, while the corresponding numbers for full-length research papers were 848 and 1,287 respectively. In terms of percentage of IT papers in full-length research papers, there was a slight increase of 2% to 2.95% (Table 3).

When different decades were concerned, GBA was the most popular topic, with a total of nine papers published in the first decade (Fig. 5). Networking, however, took the leading position in the second decade with a 20-times increase from one paper to 20 papers. The number of papers in GBA, once a fad in the first decade, dropped from nine papers in the first decade to three papers in the second decade. Another big change was the number of publications on information management, which increased from two papers to seven papers between the decades.

Table 2
Distribution of Research Categories in Different Journals

	Networking	Information Management	Intelligent Applications	User Interface	GBA	Miscellaneous	Total
ATR	0	1	2	0	1	0	4
JTR	10	4	3	2	1	5	25
TM	11	4	1	0	10	6	32
Total	21 (34.43%)	9 (14.75%)	6 (9.84%)	2 (3.28%)	12 (19.67%)	11 (18.03%)	61 (100.00%)
ITT	42 (40.78%)	16 (15.53%)	11 (10.68%)	10 (9.71%)	2 (1.94%)	22 (21.36%)	103 (100.00%)

Publications in Networking

The first networking-related paper was published in TM with the title of "Tourism, Telecommunications and Transnational Banking: A Framework for Policy Analysis," which was co-authored by Mowlana and Smith in 1990. The second networking paper appeared 6 years later in JTR. As the Internet had been widely applied to tourism, more research papers on networking were published. Since 1996, 18 out of the 20 published papers on networking were related to the Internet or the World Wide Web (WWW). In ITT, networking publications have significantly increased from two papers in 1998 to 11 papers in 2003, which represents a 5.5-fold increase. Out of 42 published papers, 24 of them were on WWW (57.14%) and six papers were on wireless networking (14.29%).

Publications in Information Management

During the study period, nine papers on information management were published. The first paper published in this category was in TM and entitled "Computerized Management of Tourism Marketing Information," which was written by Burke in 1986. The paper dealt with applying IT in managing marketing information. The most popular topic in this category was database man-

agement, which had six papers published. The remaining three papers in this category were on database marketing. In ITT, the majority of papers were about Destination Management System (DMS) and Geographic Information System (GIS). Out of the 16 papers, eight were on these two topics (50%).

Publications in Intelligent Applications

Six IT papers (9.84%) were published in this category. The first paper on intelligent applications was published in ATR in 1990 with a title "Computer-Assisted Travel counseling," which was written by Hruschka and Mazanec in 1990. Among the other five papers in this category, three papers were related to expert systems and two papers were on decision support systems. In ITT, six out of the 11 papers published were on trip planning and recommenders (54.55%) and three papers were on decision support systems (27.27%).

Publications in User Interface

Apparently, user interface was the category that produced the least number of papers. During the entire study period, only two papers were published in 1989 and 1999. In addition, both papers were published by JTR. Specifically, the first paper was entitled "Future Encounters with Science

Table 3
Full-Length Research Papers Versus IT Papers in Leading Tourism Journals

	1985-1994	%	1995-2004	%	Total
No. of IT papers (a)	17	30.91%	38	69.09%	55
No. of full-length research papers (b)	848	39.39%	1,287	60.61%	2,153
(a)/(b)		2.00%		2.95%	

and Technology,” which was authored by Shafer in 1989, and the second paper was entitled “Public-Access Interactive Computers at State Welcome Centers in the United States: 1991 and 1995 Studies,” which was written by McCann in 1999. In ITT, the most well-liked topic in this category was multilingual with four papers published (40%), which is followed by multimedia with two papers published (20%).

Publications in General Business Applications

As mentioned, GBA was the second most widely published category. The first paper in this category appeared in TM, entitled “Computer Reservation Systems and Airline Competition,” and was co-authored by Boberg and Collison in 1985. In the first study decade, the research focused mainly on the Central Reservation Systems (CRS). Since the introduction of the Internet to the tourism industry, many business applications changed their operating platforms from local servers to Internet-based servers. Such a change caused a large drop on the number of papers in this category. In ITT, however, GBA was the least popular category with only two papers published in this cate-

gory and both of them were on crew member roster builder.

Publications in Mainstream IT Journals

Figure 6 shows the full-length papers published in the mainstream IT journals, together with the publications in ITT for comparison. Among the 20 related papers in mainstream IT journals, the most popular category is networking with five papers published. Three of these five papers were related to telecommunications and the other two papers were on e-business and e-community. The second most popular category was GBA in which three papers were published (15%). The topics for these papers were on usage of IT in the tourism industry. The third most popular topic was on user interface with two papers published (10%). These papers discussed how virtual landscape and aerial photos were used in tourism. Finally, both information management and intelligent applications had one paper published in each category. The paper published on information management was related to Geographic Information System (GIS) and the paper on intelligent applications was about tour advisory systems. In addition, there were

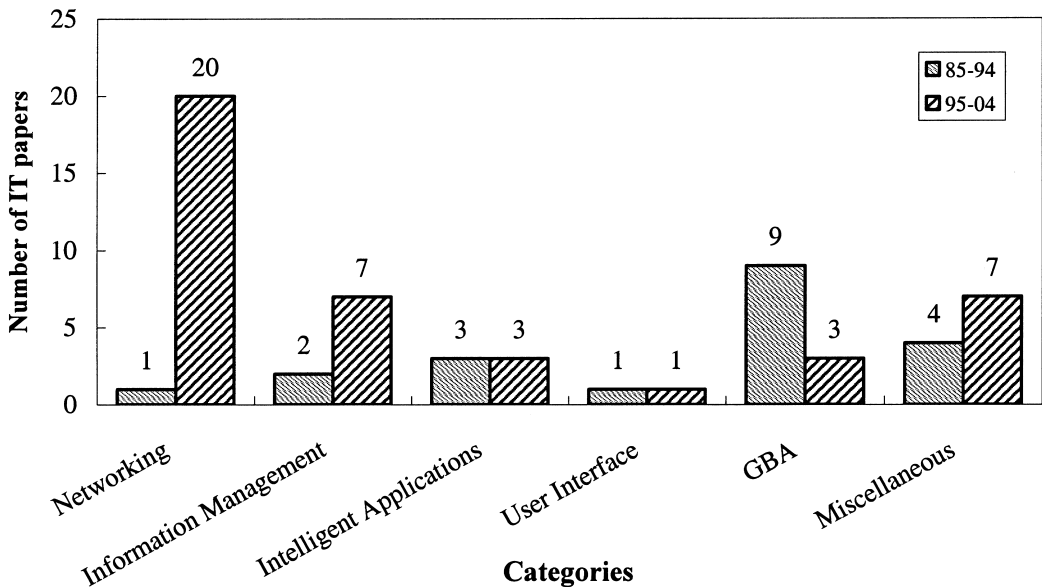


Figure 5. Distribution of research categories in leading tourism journals.

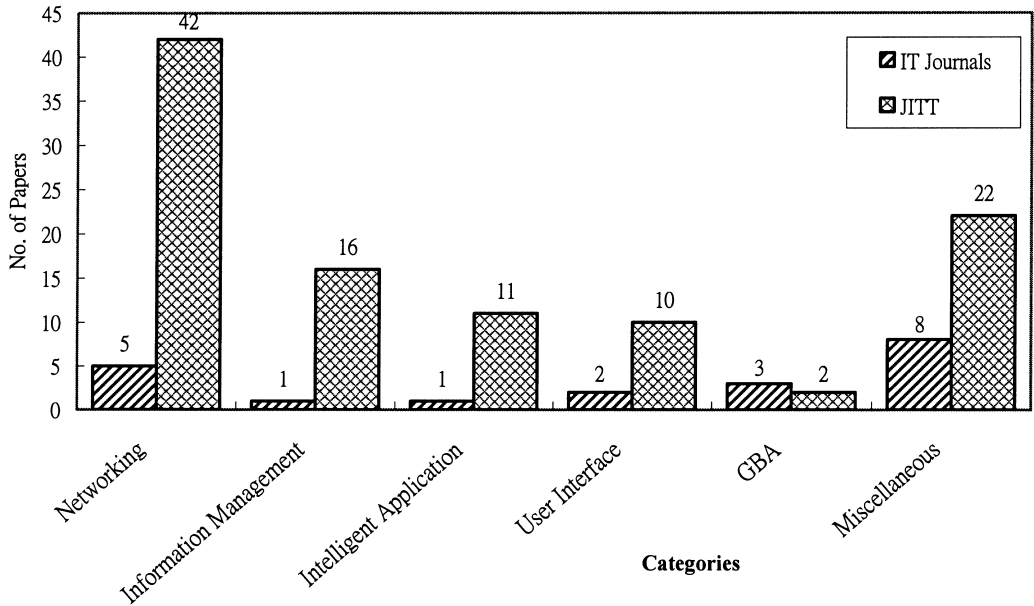


Figure 6. Distribution of research categories in ITT and mainstream IT journals.

eight papers on miscellaneous (40%). Six of these papers were on theoretical modeling and the remaining two were on tourist driving behavior and the impact of pollution on tourism.

Conclusions

Summary of the Study

IT has been widely used in the tourism industry as an important tool for providing the best services to customers. In the early 1990s, Poon (1993) advocated that “a whole system of ITs is being rapidly diffused throughout the tourism industry and no player will escape from its impacts” (p. 8). In spite of the present wide adoption of IT to tourism and the promising growth of IT publications in the three leading tourism journals, the percentage of IT research papers, among all full-length research papers, was still seriously underrepresented (2.58%). This probably suggests that IT is still not considered as a mainstream of tourism research. More research work on IT would then be beneficial to meet the industrial needs.

A noticeable observation in this study was the large change in categories. GBA, the most widely published category in the first decade, lost its lead-

ing position to most other categories. In particular, with the increasing applications of the Internet, networking took the lead in terms of the number of publications in the second decade. In addition, about 20% of the IT publications were theoretical or conceptual based. In other words, the industrial applicability of the approaches as presented in these theoretical or conceptual-based publications has yet to be proven. In a recent article, O'Connor and Murphy (2004) advocated the importance of industrial applications and that future research should have more “field experiments to show causality, and relying upon actual behavior rather than intended behavior” (p. 482).

Limitations

With the growing popularity of technological applications, there are presently hundreds, if not thousands, of IT-related research journals. In this study and searching through Science Direct's database in the categories of “Computer Science” and “Decision Science,” 196 research journals were found in the study period. Using the stipulated criteria, a total of 14 journals were found to have published 20 papers that were related to tourism.

There are two noticeable limitations of this approach. First, the IT journals that were not listed in Science Direct are excluded for analysis. In addition, some related articles in mainstream IT journals might not use “tourism” in the query terms, and hence were not returned from the database search. These two limitations are certainly worthwhile to deserve future research efforts.

Implications and Future Research

As a multidisciplinary field, tourism highly emphasizes industrial applications. Although the scope in journals’ coverage in this study limits the generalization of findings, tourism practitioners are still able to get an overall idea about the changes or trends of the types of IT that are of interest to researchers. In addition, taking these findings as a reference, tourism managers can update their knowledge in the respective area, and subsequently determine to what extent their own businesses match the norm or common practice. Likewise, public sector professionals can evaluate their level of ICT adoption in relation to academic findings. This, in turn, can enhance the ease of access, quality, and volume of information, leading to the ongoing improvement of information provision and marketing for travel destinations.

While the findings of this study are interesting, and as mentioned previously, the extent to which tourism IT papers have been published in research journals that were not included in this study is basically unknown. Hence, more work is needed in the future to extend the coverage scope of research journals, in general and in particular in the mainstream IT or management journals. Also, a future study can examine conference papers. Due to the large difference in nature between research journals and conferences, extra care should be taken when mixing publications in these channels for analysis. Another possibility for future work is to investigate the level of industrial applications of the attributes and categories as presented in this article, as well as to further elaborate the attributes in different categories of the framework. Most importantly, it would be of paramount importance to find out whether there are any gaps, and how large these gaps are, between academic research and industrial applications.

Biographical Notes

Ms. Rosanna Leung received her bachelor (Hons.) degree in Electronic Commerce and M.Sc. in Hospitality and Tourism Management in Hong Kong’s universities. She has been in Hospitality IT for over 18 years and has been involved in various hotels’ pr-opening and data migration projects in Hong Kong and Mainland China. Presently, she is the IT Manager in Hotel Nikko Hong Kong.

Dr. Rob Law is presently an Associate Professor of Information Technology at PolyU’s School of Hotel & Tourism Management. Dr. Law actively serves the international academic community. He works for 30 research journals, and he has served on the committees of more than 40 international conferences on Information Technology and tourism/hospitality.

Appendix: List of the 14 Mainstream IT Journals That Published Tourism-Related Papers

Card Technology Today
Computers & Geosciences
European Journal of Operational Research
Expert Systems with Applications
Information & Management
Intelligent Data Analysis
Interacting with Computers
International Journal of Information Management
ISPRS Journal of Photogrammetry and Remote Sensing
 (with two papers)
Mathematics and Computers in Simulation (with four papers)
Pattern Recognition
Telecommunications Policy (with three papers)
The Journal of Strategic Information Systems
Transportation Research Part A: Policy and Practice

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