Information Supply in Tourism Management by Marketing Decision Support Systems

Tourism Management
www.elsevier.com/locate/tourman
24 (2003) 241-255

Karl W. Wöber

Institute for Tourism and Leisure Studies
Vienna University of Economics and Business Administration, Austria
Augasse 2-6, 1090 Vienna, Austria
karl.woeber@wu-wien.ac.at

Karl Wöber received his Ph.D. from the Vienna University of Economics and Business Administration. Since 2000 he has been Associate Professor at the Department for Tourism and Leisure Studies, consultant to the Austrian Society of Applied Research in Tourism (ASART), and Technical Advisor of European Cities Tourism (ECT). His main research activities are in the fields of decision support systems, strategic marketing planning, and evolutionary computation particularly with applications in city tourism and hospitality management.

Information Supply in Tourism Management by Marketing Decision Support Systems

Abstract

The importance of information and efficient information management is steadily increasing due to the evolution of new technologies and high-capacity storage media but also because growing market dynamics raise information needs. A marketing decision support system (MDSS) can be of particular importance as it supports organizations in collecting, storing, processing, and disseminating information, and in the decision-making process by providing forecasts and decision models (Little 1979). The following article provides insights into a successful implementation of a MDSS in tourism. Based on findings on the analysis of the system's protocol files, it discusses the information needs in tourism management.

Keywords: Marketing Decision Support Systems (MDSS); Tourism Statistics; Internet

1. Introduction

Operators in tourism management, compared to other management sectors, are confronted with a vast field of complex aims, requiring different plans of action. The special working requirements of the services sector are a result of its business peculiarities. Problems in strategic, and frequently operational planning, are characterized by their complexity, often being intermingled, non-transparent, individualistically dynamic and requiring the achievement of multiple goals. The vast amount of information or complex weighting of the different sectors can present an insurmountable problem for human resources. As a result there are high expectations of decision-makers' trouble-shooting abilities.

In order to solve complex problems, decision-makers need to have a factual knowledge of the industry (declarative knowledge) and the methodology used (procedural knowledge). The wealth of knowledge is drawn from two pools; that obtained from the "storage" of already existing experiences, and by generating knowledge in the respective field. Combining these two pools creates an arena for problem solving.

1.1 Declarative Knowledge – Decision Basis in Tourism Planning

Currently, information gains more and more importance, leading legitimately to the development of a fourth economic sector – the information sector. Information also plays a vital role in tourism for entrepreneurs and managers who spend the whole day involved in information processing. In the tourism industry there is no lack of market research data, on the contrary, there is a rather uncontrolled growth of various data sources, each having different survey purposes and survey designs. Tourism surveys of national and international market research institutes are published in ever shorter intervals and the level of itemization of market data increases rapidly. Information collected by these means has indicated data which can be organized into the following groups (Seitz and Meyer 1995):

1. information on markets and environment,
2. information on customer behavior,
3. information on competition in the industry, and
4. internal information for executive boards.

The first three information groups are predominantly non-discretionary from a manager's point of view as the information can very rarely be directly influenced by an individual company. Information from these groups are similar in nature and scope for most sectors represented in the tourism industry (hotel trade, restaurant trade, tour operators, travel agents, common carriers, pressure groups, etc.). In the fourth group however, there is a larger scope for variety (Hebestreit 1992, p.92).

Due to high costs for primary market research many tourism managers abandon market research in general (Seitz and Meyer 1995, p.18). Even the larger businesses and tourism organizations lack market research departments and employees rarely work exclusively on market research items. This results again in an inconsistent development of marketing aims and strategies, as businesses as often as not grope in the dark for their direction.

In Europe the most frequent or highly recognized of the commissioned tourism studies are either publicly financed, directly by national or local authorities, or indirectly by government agencies. This method of procuring market research, is important and often a condition for its development, as the expensive primary studies cannot be financed by the nu-

merous small or medium-scale businesses. The resulting *obligation to pass on information,* created by the above mentioned research financing, has lead to a wider search - in regional tourism organizations, and other bodies representing tourism - to find means of successfully sharing and communicating information.

Traditional data resources in tourism market research are reports, records and statistics which may be presented either in printed format or are electronically driven (CD-ROM). Computer-based information systems (databases) are currently a rarity, but usually can be found either in connection with the official statistical data of a country or a region (i.e. http://www.oestat.gv.at/ - Statistics Austria) or international institutions (i.e. http://www.world-tourism.org/ - World Tourism Organization, http://europa.eu.int/comm/eurostat/ - Eurostat, database of the European Union). The information available by this method is rarely used since it ignores the special information requirements of the end-user (managers), or is simply inaccessible due to high fees, complicated application procedures or is simply not user friendly. The lack of practical relevance, of these information systems, can be explained by their bias toward representing the economic interest of the sponsors and data collectors and/or by the universal requirements the systems have to meet in the collection, storage and search of statistical data from other industries.

Market research results are mainly available in print and they can be obtained either in bookshops, online (see i.e. http://www.studien.at/) or directly from the author. From the consumer's perspective this way of passing on secondary information has a number of disadvantages:

- Due to the complex design of market research reports the surveyed data is not up to date anymore.
- Data from different sources cannot be easily compared especially if it has been surveyed for different purposes.
- Information contained in reports is often of limited relevance for the particular problem.

- Presentation of data is either not detailed enough, not significant enough, or supplementary information is missing which prevents a faultless interpretation of results.
- Often only very specific data from a more comprehensive study is required and thus the cost-benefit-ratio becomes unattractive.

There is usually an over-abundance of available information leaving managers to cope with determining which is the best source. Often the entrepreneur has to rely on external consultants and market research specialists resulting in additional costs.

1.2 Procedural Knowledge – Decision Basis in Tourism Planning

"The big problem with management science models is that managers practically never used them." More than 20 years ago John Little described the discrepancy between the scientific development of planning instruments, models, level of itemization and the fact that, when available, the knowledge gathered is rarely put into practice. This is caused by the numerous, often poorly documented assumptions of model architects, which was denoted as *model platonism* by Hans Albert (Albert 1967). As a response to this problem Little suggested that the manager is included in the model (Little 1970). He postulated in his article on the *Decision Calculus,* on-line models with the following features: robustness, ease of control, simplicity, completeness of relevant detail and suitability for communication.

The communication problem is of vital importance in the every day life of managers' daily events. It is still common practice to employ various levels of change rather than continually observe the changes in market share and volume. Many entrepreneurs do not even know terms such as market segmentation or market positioning and they do not regard them as essential. They keep on looking for measures to expand seasonal business but lack knowledge of methods that will measure their success. Corporate planning only takes place if external financing is required and supporting documents have to be submitted to the lender (Phillips and Moutinho 1998:68). Heuristic forecasting methods are hardly ever used, accordingly quantitative methods are never used. Models of strategic market plan-

ning - portfolio analyses and analyses of the lifecycle of a product - employed in other industries are hardly ever used in tourism management.

The grounds for the poor employment of methodological processes in tourism management can be divided into two groups; technological development and insufficient training.

Issues related to the *technological development* of existing information processing and transmission systems are:

- Data required for the application of tourism models is either not up-to-date or unsuitable.
- Standard software is not able to support the relatively complex tasks in tourism management.
- Specially developed software is too expensive for single tourism businesses.

Issues related to the insufficient training of tourism managers are:

- Managers have little knowledge of existing methods or available data.
- Managers are confronted with various data sources and different results and they do not know how to cope with this situation.
- Managers do not know which data sources and models are suitable.

2 The Transmission of Market Research Data in the Internet

Due to the vital role of tourism in many countries and regions in Europe a number of programs concerning tourism promotion have been installed. Government and private tourism organizations have been established in order to strengthen a tourism destination. Usually the aim is to increase the added value of a region. The major tasks of these bodies are:

- to provide consumers with information about the destination,
- to coordinate and implement sales promotion measures,
- tourism advertising,
- support in sales and distribution, and

- to coordinate and implement market research projects.

For most of their tasks (except the coordination and implementation of market research projects) these tourism promoting bodies provide efficient methods. The actual effect of the last item mentioned has been lost in the past due to inefficient instruments relating to the transmission and utilization of declarative and procedural knowledge. Now with the development of cheaper hard- and software many tourism organizations are reconsidering their promotion policy.

In almost all industries systems are being developed in order to support investment and marketing planning (Wierenga and van Bruggen 2000). Also the tourism industry has developed decision support systems and the most important applications are: (1) systems supporting marketing decisions in national tourism organizations (Mazanec 1986, Rita 1993), (2) travel counselling systems for shipping clerks (e.g. Hruschka and Mazanec 1990), (3) systems supporting regional planning regarding the optimal selection of locations in which to invest (Calantone and di Benedetto 1991, Walker et al. 1999) (4) systems providing tourism portfolio analyses (Mazanec 1994, 1998, Wöber 1998), (5) simulation tools for forecasting travel behavior in certain regions (Middelkoop 2001). In Austria in 1982 the Austrian Society of Applied Research in Tourism (ASART) started a project aiming at the development of a marketing information system for the national tourism organization in Austria (Austrian National Tourist Office). The first version of the tourism marketing information system (TourMIS) consisted of a database installed in a host system of the Scientific Computer Center Vienna and an optimization programme for the advertising budget of the Austrian National Tourist Office (Mazanec 1986). Though the programmes were adapted in 1991 in favour of PC-software, and hence became accessible for a greater number of people (mainly employees of tourism organizations in the federal provinces), the area-wide information supply for top managers in the tourism industry did not begin until 1999 when the internet version (www.tourmis.wu-wien.ac.at) was introduced.

3 Tourism Marketing Information System

The major aim of TourMIS is an optimal information supply and decision support for the tourism industry. The first step is to provide on-line tourism survey data, as well as

evaluation programmes to transform data into precious management information. TourMIS predominantly comprises:

1. a **database** containing tourism market research data (declarative knowledge),
2. various program modules (**method-base,** procedural knowledge) converting acknowledged methods/models into simple surfaces, and
3. various administrative programmes which assist the maintenance of the database and track and control the information search behaviour of users.

The internet supports the transport and presentation of animated and unanimated pictures, sound and video recordings and text and numerical data and is expandable. A high-performance SQL-database and a functionally designed user interface for TourMIS based on hypertext and Perl permits the development of interactive applications. The programme modules contained in the method-base are developed according to the specific requirements of tourism managers. The internet offers a number of advantages against the old PC-solution. Since changes in the database have immediate world-wide effect the speed of information transmission can be reduced to the availability of the information source. For example, TourMIS makes the monthly projections of Statistics Austria available within only a few seconds to all regional managers of the Austrian National Tourist Office regardless of whether they are located in New York, Sydney, Tokyo or Madrid. Anybody provided with access to the internet and entitled to use TourMIS may access data and information, make calculations or simulations send or receive data – without tiresome postal procedures, danger of loss, delays and costs. All these advantages have led to a significant expansion in the number of users.

3.1 Conditions for the Use of the System

In the beginning TourMIS was provided with strict access control and used to be only accessible to certain users. In this respect the application did differ from traditional internet offers. However, the present concept is also not an *Intranet*. Unlike the Intranet which supports internal information management systems TourMIS is not owned by a certain organization but is open to all authorized tourism organizations, societies, tourism consultants, companies, tourism training centres, pressure groups, etc. in Austria and abroad. By

covering the maintenance costs, a consortium of 12 of the most important initiators of market research projects in Austria (Austrian National Tourist Office, nine provincial tourism organizations, the two special interest associations for Hotel Trade and Restaurant Trade of the Federal Chamber of Commerce, Federal Ministry for Economic Affairs and Labour Tourism and Recreational Commerce Section) guarantee the continuous updating of the comprehensive database. Since 2000 this initiative has provided the Austrian tourism industry with free access to overall data and functions (with some exceptions) of TourMIS. The necessary hardware resources are situated at the Institute for Tourism and Leisure Studies at the University of Economics and Business Administration in Vienna where a major part of the necessary maintenance work is carried out.

3.2 The TourMIS Database

In the beginning TourMIS contained data that was strongly influenced by the internal interests of its commissioner, the Austrian National Tourist Office. In this respect international tourism statistical data, empirical tourism studies and economic indicators for the most important markets of origin for the Austrian tourism industry have been collected in TourMIS. The PC-version, developed in the early nineties, contained more than 10,000 time series. The periodicity of information was generally based on annual data, however the most significant time series have also been recorded for periods of less than a year.

Over the years the database has continually expanded. Due to the increasing importance of overseas markets further information has been required. Unequal needs of provincial tourism organizations led to additional statistics regarding the federal provinces and Vienna, being city and federal province at the same time, acquired an exceptional position. Furthermore data on the Austrian and international city tourism has been added. This information was collected at the branch offices of the Austrian National Tourist Office, transmitted by fax and data was entered manually into the marketing information system in order to be available to users. Later based on international co-operation (European Cities' Tourism, European Travel Commission) the first online maintenance agreements with local tourism organizations were initiated. The most important available data sources of TourMIS are indicated in Table 1. Besides the basic information search functions the method-base has also been continually upgraded. In this respect the system more and more

meets the requirements of an efficient decision support tool. In the next paragraphs the most important data sources and the facilities for analysis and reporting are discussed.

3.2.1 National Tourism Statistics Austria

One of the first data sources which was installed in TourMIS was the official tourism statistics in Austria. Data generated from the registration with accommodation suppliers is one of the fundamental supports of the official inbound tourism statistics in Austria. Accommodation statistics are divided into two different kinds of survey: the accommodation for inbound travel and the accommodation capacity (Statistik Austria 2001). The data on arrivals and overnights are surveyed for 50 generating countries related to 13 different accommodation types and 1,600 municipalities (= report communities) on a monthly basis. Thus the official travel survey offers 25 million data points per annum which can be transformed into precious information for tourism managers. From the data material important information on tourism development, trends in markets of origin and accommodation types, evaluation of the competing situation can be derived. For example, for each of the 1,600 municipalities the database allows the user to regularly monitor the development of the average duration of stay, the seasonality, market shares, guest-mix structure, and, in connection with the capacity statistics, the occupancy rate.

TourMIS presently offers official tourism statistics only at the provincial basis which nevertheless requires maintenance work of 11,700 data sets per month. The necessary data transfer from the host system of Statistik Austria (ISIS) to TourMIS takes place automatically each time after the arrival of new data segments and in accordance with various maintenance routines.

The information supply of TourMIS users takes place by means of predefined tables and reports created for the user in real time operations. Table formats conform to the data material. The design of a single table or a single report is of vital importance. The content and design of tables or reports plays an important role in the user's perception of the system's usefulness and usability (Wöber and Gretzel 2000). Only if the information supply meets the users' needs will the system achieve its aim of providing a high-performance usage of market data and improve the information supply in tourism management.

Source	Feature	Evaluation	Period	Update	Data format
Statistik Austria	bednights, arrivals, capacity (suppliers and beds)	50 countries of origin (markets), 13 types of accommodation – for Austria and her 9 provinces	since 1960	monthly	secondary data in time series format
Austrian Guest Survey	250 variables incl. intention to revisit, guest satisfaction, type of travel, means of transport, duration of stay, travel motive, expenses, selection of accommodation, activities, net income of the household, profession, education, etc.	16 countries of origin (markets) – for Austria and her 9 provinces	since 1991	each third year	primary data
ETC (European Travel Commission)	bednights, arrivals, capacities (beds)	21 countries of origin (markets) – for 33 destinations (countries) in Europe	since 1990	annually	secondary data in time series format
ECT (European Cities' Tourism)	bednights, arrivals, capacities (beds)	21 countries of origin (markets) – for 80 European cities	since 1983	annually	secondary data in time series format
Number of visitations in Austrian attractions (Austrian National Tourist Office)	number of visits for 240 Austrian attractions	federal provinces of Austria	since 1998	annually	secondary data in time series format
Austrian Hotel and Restaurant Panel	60 variables incl. net product, fixed and working assets equity and debt capital, , cash flow, profitability figures, etc.	location, size, category and type of business.	since 1982	annually	primary data

Table 1: Data Sources in TourMIS

Therefore, all available TourMIS tables and reports are created in close collaboration with the tourism industry. The query results are presented in the form of tables, texts and graphics or in a data format offering the chance for further processing with another standard software product (e.g. spreadsheet programmes). The major advantages of TourMIS compared to the official database supply offered by Statistik Austria are:

- no particular database knowledge is required by the user,
- the data transformations and calculations implemented in the method-base of TourMIS allow for adequate problem reporting, and
- the user interface refers to a familiar technical terminology.

Especially for the requirements of the managers in the provincial tourism organizations TourMIS offers tables with more detailed analyses. Fig.1 presents an example for competitive analyses in TourMIS for destination management organisations. The table compares the seasonal results of one federal province (Carinthia) with the results of all other federal provinces in Austria. The table shows all bednights broken down into different markets of origin arranged in accordance with their significance and the changes against the previous year. The comparison with the developments in other (competitive) destinations permits an evaluation of the market share development in Carinthia. The analysis in Fig.1 indicates for example that Carinthia could defend its position regarding the three most important markets (Germany, Netherlands, Italy), shown in the increase of market shares, despite the fact that Carinthia experienced a severe loss in bed-nights. On the other hand an apparent success regarding the increased demand of American guests (+ 7,7%) has to be put into perspective since the other federal provinces outperformed Carinthia in this segment. Due to the comparative analysis and a simple and informative presentation of the statistics (using sorting features and different colors to distinguish between market share gains (green) and losses (red)) the data material is upgraded. The analysis presented in Fig. 1 may be used for historical or current data, for each Austrian province, based either on arrivals or bednights for each of the 13 different accommodation types. Therefore there are at the end of a season 270 new tables available for interpretation.

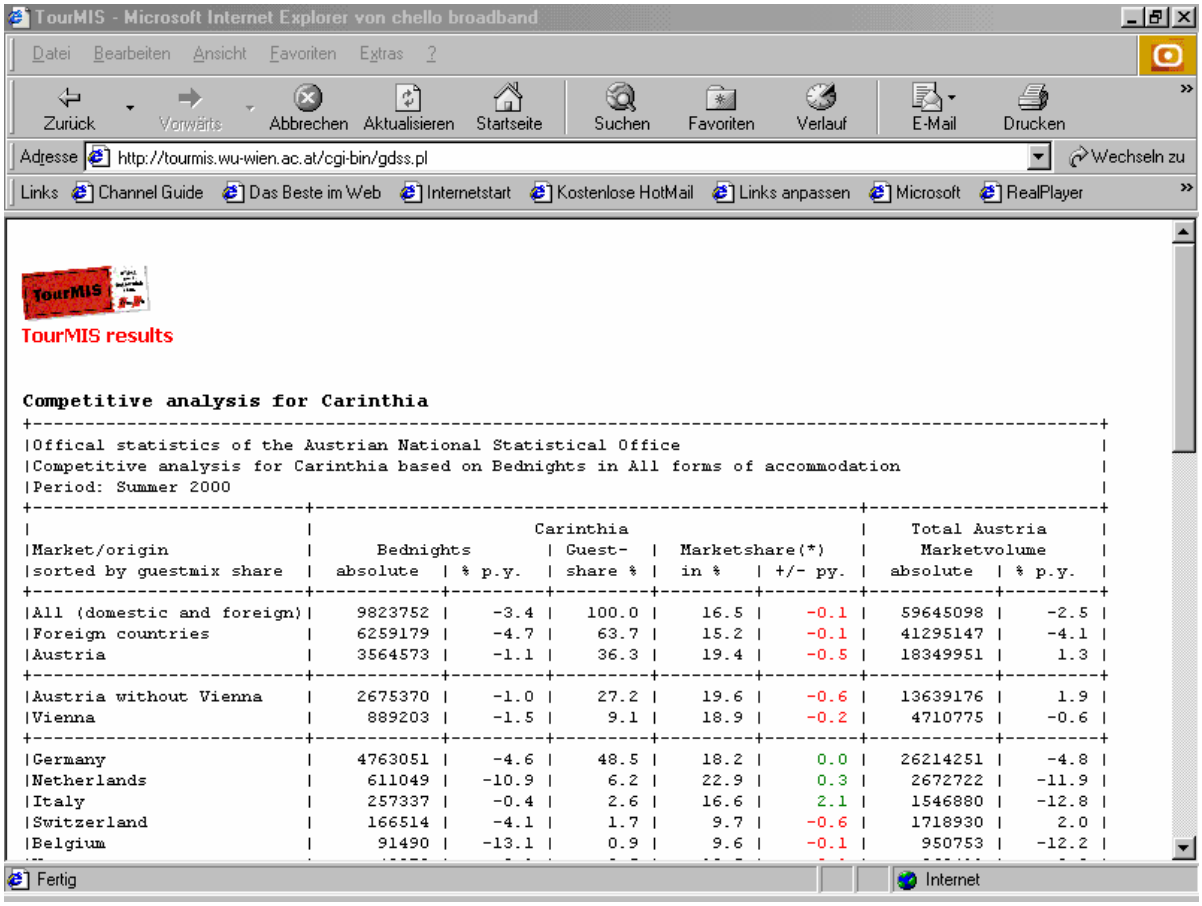

Figure 1. Competitive Analysis for Austrian Regions

The opportunities for implementing tools which use official tourism statistics for benchmarking analyses, the implementation of early warning systems and forecasting tourism trends is obvious. Due to the refinancing interests of data collection authorities and the lack of financial resources in the tourism industry, however, the data analysis for smaller tourism regions or report communities has been prevented in the past. This factor must be regretted since it can be assumed that the evaluation of key success factors in tourism marketing will significantly improve when they are measured in smaller regional units. Also tourism managers, especially those operating on a regional level, usually have only very little influence in the organization of nationwide surveys. Therefore, many of the statistical series are based on administrative regions that are not always congruent with actual regional use and by tourists and subsequent flows.

3.2.2 Number of Visitations in Austrian Attractions

The collection of statistical data on leisure-time activities and especially the measurement of visitor arrivals in attractions is a rather complex project. It is rarely executed internationally on a systematic or continuous basis. The major problems lie in the delimitation of the study object and the methods of measurement. Since the early 90's the Austrian National Tourist Office has collected and distributed information on the visitation numbers in Austrian attractions. In close collaboration with the nine provincial tourism organizations a list of 240 Austrian attractions is checked for completeness and up-dated on an annual basis.

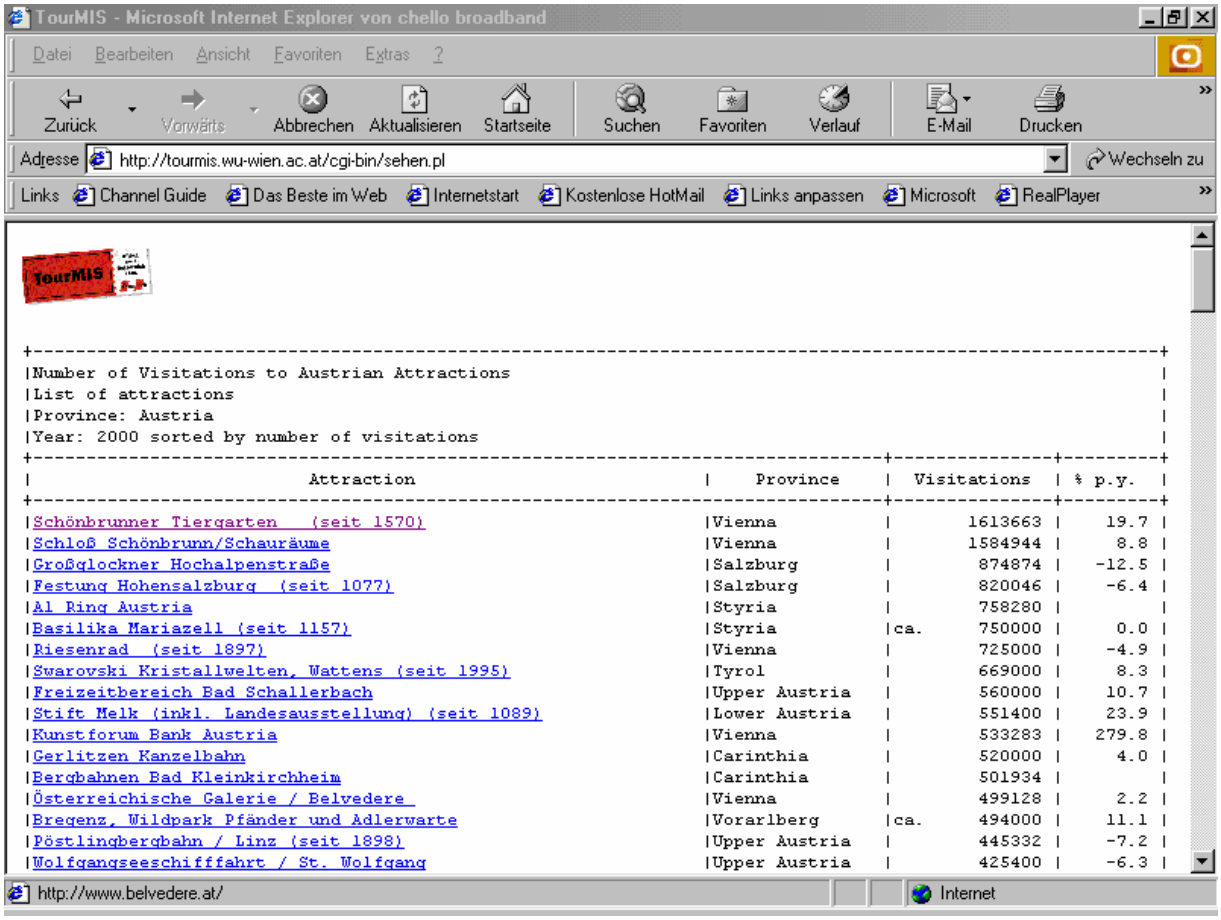

Figure 2. Number of Visitations in Austrian Attractions

Since 2001 this maintenance procedure is carried out online in TourMIS. Here the market research specialists at the respective provincial tourism organizations enter their information into the system. Due to the newness of the database the reporting facilities are still

very limited. The present tables either provide simple time series for a single attraction or list all attractions for one or more federal province(s) arranged according to frequency of visits. (see Fig. 2).

3.2.3 Austrian Guest Survey

Since 1988 alternating each third year a comprehensive visitor survey in Austria has been carried out. The Austrian Guest Survey is one of the most important sources of information in tourism market research. It provides vital information on guest profiles, customer satisfaction, information and booking behaviour, type of travel, destination, means of transport, accommodation, activities, visitor expenditures and other current topics. The Austrian Guest Survey is financed and coordinated by a consortium of authorities responsible for tourism promotion in Austria (Austrian National Tourist Office and nine provincial tourism organizations), the Chamber of Commerce and the Federal Ministry for Economic Affairs and Labour (Tourism and Recreational Commerce Section).

Since the Austrian Guest Survey is a primary study it presents some features which complicate the information diffusion in TourMIS compared to the above mentioned secondary data sources. The main reasons for these additional difficulties are:

(1) the much wider scope of the study,
(2) the required data analyses are more demanding, and
(3) interpretation possibilities are limited by the sample size and characteristics.

The Austrian Guest Survey has more than 200 features which are partially modified for each survey. Considering the scope of the study and that only descriptive evaluation is possible the Austrian Guest Survey offers more than 1 million findings per survey. Traditional forms of report (market research report, press releases etc.) cover just a small part of the real investigation and evaluation potential. Thus important questions managers would raise remain unanswered although theoretically the answers exist.

Data of primary analyses are available unprocessed (disaggregated data format). Regarding the Austrian Guest Survey there are 10,000 interviews per survey, all of the features being

available in quantitative form. However, information processing requires the application of analytical methods ranging from calculating simple mean values to complicated data mining procedures. The necessary methodological knowledge has to be obtained from statistics experts who create costs which, in most cases, cannot be covered by the tourism industry. Therefore, due to a lack of know-how or lacking financial support, many questions managers raise remain unanswered although data actually would be available.

Contrary to a census, as found in official statistics, sample surveys do not integrate all elements of the whole picture into the study. The major aim in statistics is to draw reliable conclusions regarding to the totality from a limited number of elements. The previously mentioned evaluation procedures take more effort and interpretation depends on the features of the sample (sample size and sampling technique).

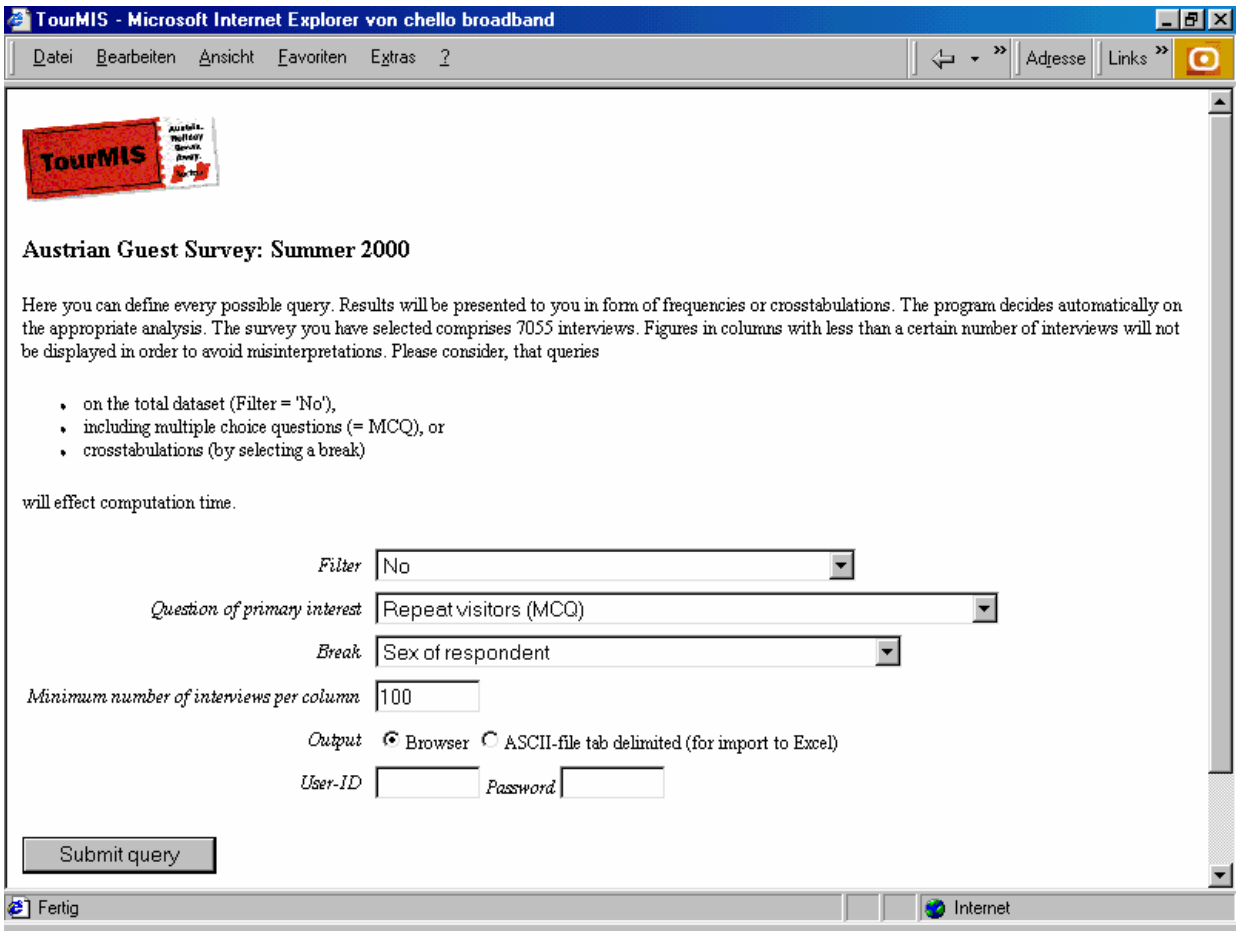

Figure 3. Query – Austrian Guest Survey

To know whether a study result may be regarded reliable requires expert know-how. On the other hand, sometimes, statisticians have not enough technical knowledge to evaluate the fault tolerance for certain problems in the tourism industry. Thus information processing by means of electronic media becomes very interesting for primary surveys. The challenge is to combine expert know-how from two different fields: statistics and tourism. The aim is to create an arena for practitioners allowing them to access all possible evaluations concerning a data item, without considering the necessary procedures of analysis (Fig.3). TourMIS offers help in the selection of simple, descriptive evaluation methods. Depending on the level of measurement of the features selected by the user the appropriate evaluation method is applied:

	Measurement		
Measurement	Not specified	Nominal	Metric
Metric	descriptive statistics	mean value comparison	mean value comparison
Nominal	frequency	cross tabulation	
Nominal multiple response question	multiple response – frequency	multiple response – cross tabulation	

Table 2: Automatic Selection of Analyzing Methods

In addition the user may select only a certain part of the overall data set for evaluation (i.e. data of a certain province or market). In order to prevent interpretation errors due to unreliability of results, those values based on a small sample are only indicated after informing the user about the problem.

The analysis takes place in real time (Fig.4). TourMIS provides the facilities to evaluate more than one survey, at the same time offering two alternatives: longitudinal and cross section analyses. The first application informs the tourism manager about changes in the guest behavior over a specified period of time. Query support is provided by offering only variables surveyed unmodified over the overall selected period of time (i.e. the standard questionnaire programme). The latter application increases the sample size (for 4 surveys more than 45,000 interviews) which makes answers to detailed questions possible (assuming a particular time invariance, of course). This function permits for example reliable

results about the share of side expenses of Italian guests in the federal province of Salzburg during a particular season.

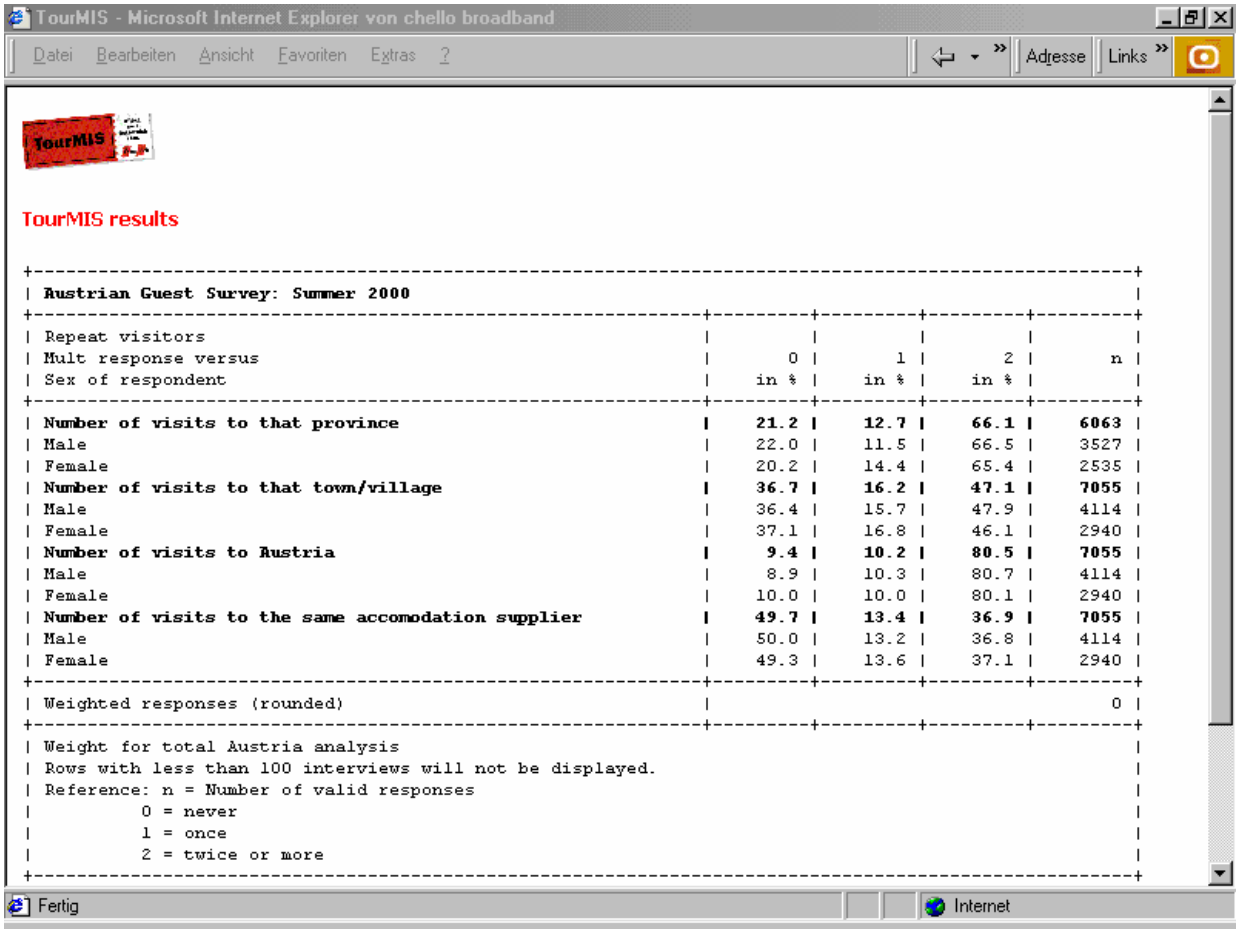

Figure 4. Query Result –Austrian Guest Survey

3.2.4 Comparison of hotel and restaurant groups

The database supports regional planners and tourism managers in their decisions as well as managers in the hospitality industry. The results of the past 10 years of a project which has been executed by the Austrian Society of Applied Research in Tourism and commissioned by the Austrian Hotel and Restaurant Association situated within the Austrian Federal Chamber of Commerce are presented in TourMIS. In this project operating data and annual financial statements for hotels and restaurants in Austria are compared on an annual basis. Information collected directly from the businesses with a high level of itemization is supplemented with comprehensive, compressed data stored at cooperative industry related organizations such as the Wirtschaftsförderungsinstitut der Austrian Federal Economic

Chamber- und Tourismusbank and BÜRGES Förderungsbank of the Austrian Federal Ministry of Economic Affair and Labour (Wöber 2001). In connection with the design and evaluation of continually repeated surveys a number of new approaches for the diagnosis and comparison of industry groups are developed. TourMIS presently provides the following applications:

- Industry information for more than 1,300 hotels and restaurants per year since 1991.
- Various functions supporting key ratio analyses in the hotel and restaurant industry.
- The chance for hotel and restaurant managers to participate online in the most significant hotel and restaurant panel survey in Austria.

Information about more than 50 different key ratios is provided in the form of arithmetic mean and median values for 30 distinguished industry groups (Fig.5). Within the industry groups additional evaluations for businesses of excellent profitability (best practice enterprises) are available.

For the hotel and restaurant panel database TourMIS users are provided with the following query and analyzing facilities:

- Evaluation of a key ratio for all industry groups referring to a certain year.
- Comparison of all key ratios for a particular industry group.
- Development of a key ratio uncovering the main industry developments.
- Benchmarking analysis for a particular hotel or restaurant (only provided when managers are actively participating in the study).

The quality of information based on the results of the survey is strongly influenced by the number of participating businesses. Due to the chance for interaction in the internet the first results may be obtained straight after entering business data. In this context the problem of how to prevent participants from entering incorrect data occurs. TourMIS offers a number of plausibility controls during data entry and records data in a second, temporary database. At regular intervals experts determine which records are qualified to be stored in the general database.

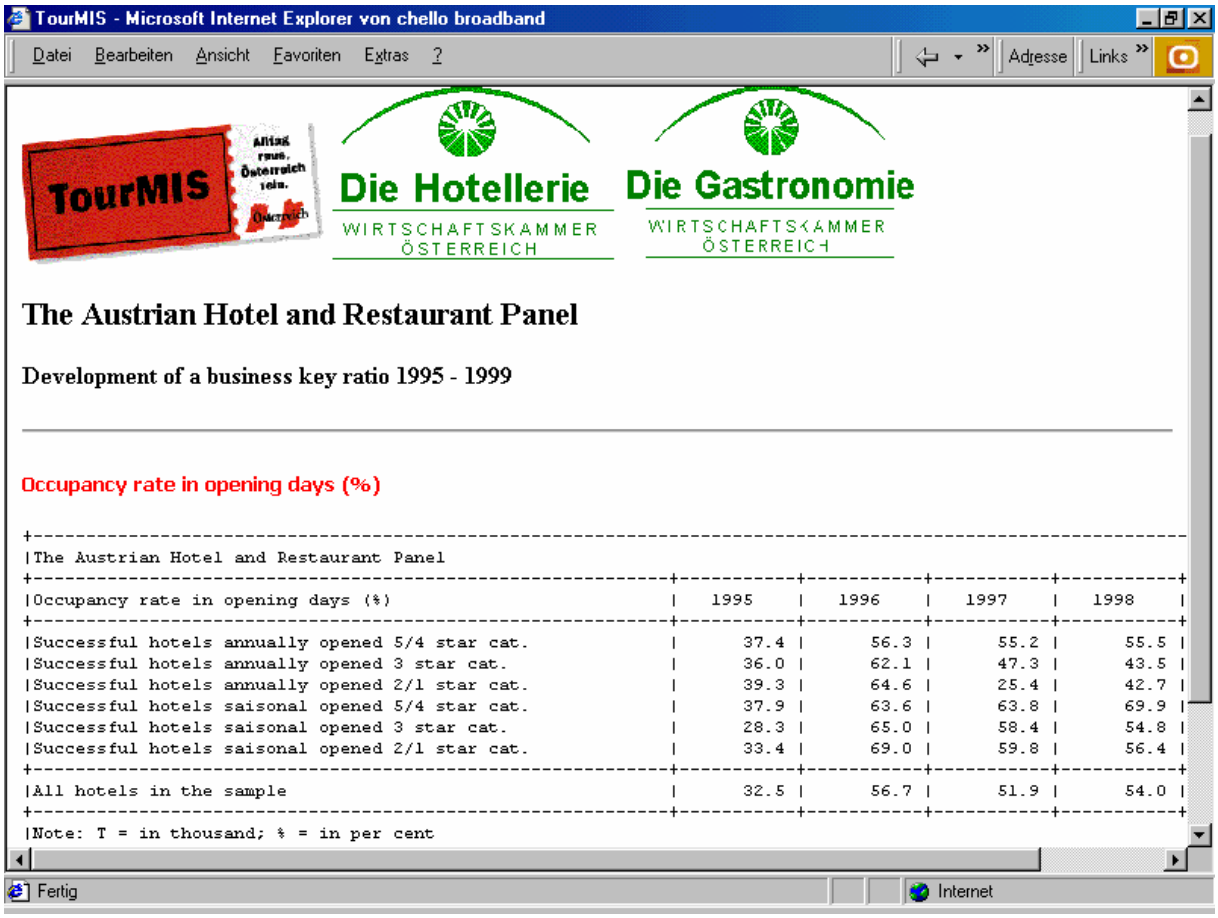

Figure 5. Development of Business Key Ratios in Hotels and Restaurants in Austria

3.2.5 International Tourism Statistics

Several international umbrella organizations have decided to collect tourism statistics from various countries and to observe the economic development of tourism (WTO, WTTC, OECD, Eurostat). The availability of this data is unfortunately restricted and publications are, due to complicated data collection procedures, obsolete and access to data is relatively expensive. The European Travel Commission (ETC[1]), the umbrella organization of national tourism organizations, and European Cities Tourism (ECT[2]), the umbrella organization of European city tourism organizations, have set themselves the target of representing the interests of tourism practitioners. Both organizations have taken advantage of Tour-

[1] see http://www.etc-europe-travel.org/

[2] see http://www.europeancitiestourism.com/

MIS for some years now in order to collect official statistics of their members (currently 33 countries and more than 80 cities in Europe). Once a year market research experts collect bednight and arrival data of national and cities´ tourism organizations broken down into the major markets of origin as well as into the number of accommodation suppliers and beds in their region.

Due to differing definitions and survey methods applied by the various countries and cities the collected data material is not readily available or comparable (Wöber 2000). Official statistics are only of limited use for the calculation of market volumes and market shares. Therefore comparative analyses have to be executed based on observations of relative changes but not on the basis of absolute values (Fig. 6).

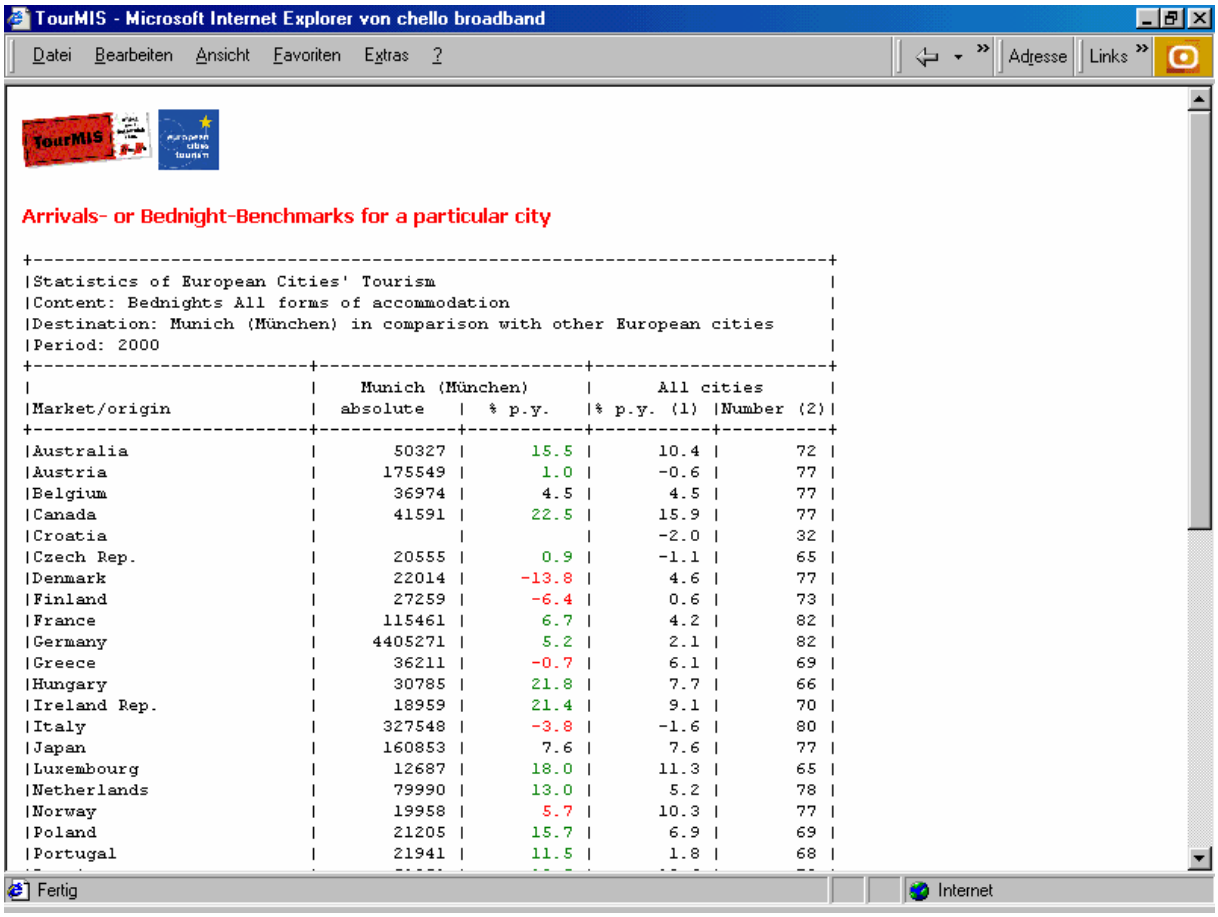

Figure 6. Destination Benchmarking – Example for Munich

As with the decision 90/665/EEC of December 1990 of the European Council a milestone has been laid down regarding the development of a community methodological framework

of the compilation of Community tourism statistics.[1] Since 1997 the development of an information system for tourism statistics has been in progress.[2] Unfortunately free access to the information system implemented by EUROSTAT is restricted to data suppliers and organization of the European Union. But experience with TourMIS shows that worthwhile discussions on diverse survey methods, definitions and harmonizing methods depend on the number of participants. Participation is necessary in order to gain acceptance for new directives and changes.

4 Analysis of the User Behavior of TourMIS

How do we know that we have successfully implemented a system? Researchers have not really agreed on an indicator for successful implementation (Eierman et al 1995). One appealing approach is a cost-benefit study. In this evaluation, one totals the costs of developing a system and compares them with the benefits resulting form the system. In theory, this sounds like a good indicator of success, but in practice it is difficult to provide meaningful estimates. Obtaining the cost side of the ratio is not too much of a problem if adequate records are kept during the development of the system. However, an evaluation of the benefits of a computer-based information system is difficult. How can the value of improved information processing be measured? With transactions processing and some operational control systems, it is usually possible to show tangible savings. For example, many transactions systems have resulted in increased productivity in processing paperwork without a proportional increase in cost. Operational control systems, such as those used to control inventories in large hotels and restaurants, may reduce inventory balances, saving storage and investment costs while maintaining existing service levels.

For systems that aid a decision maker, it is much more difficult to estimate the benefits. For a marketing information system, like TourMIS, use of the system is voluntary. A manager or other user receives a report but does not have to use the information on it or

---

[1] Council of the European Union (editor), Council Directive 95/97/EEC of 23 November 1995 on the collection of statistical information in the field of tourism, Official Journal nr. L291 of 6 December 1995, p. 1.

[2] Commission of the European Communities (editor) Report to the Council, the European Parliament, the Economic and Social Committee and the Committee of Regions on the Application of the Directive of the Council 95/97/EEC on the compilation of statistical data in the field of tourism, 17 January 2001, p. 3

even read the report. In particular systems that provide on-line retrieval of information from a database can be classified as voluntary since the use of such a system is frequently at the discretion of the user. For this type of system where use is voluntary, it is generally accepted that high levels of use is a sign of successful implementation (Davis 1989, Venkatesh and Davis 2000). In this case the economic or personal success of its users is indirectly measured by the frequency of usage. Several authors have shown that the frequency of usage is determined by the perceived usefulness (textual component) and the ease of use (technical component) (Davis 1989, Wöber and Gretzel 2000).

		Queries			
User groups	users in %[1]	2000	2001	2001 in %	per user[1]
National tourism organizations	11.3	4,844	4,957	14.4	44
Branch offices of national tourism organizations	5.7	3,541	2,970	8.6	52
Provincial tourism organizations	4.5	3,072	4,132	12.0	92
City tourism organizations	6.1	1,125	1,488	4.3	24
Regional tourism organizations	2.8	78	204	0.6	7
Accommodation suppliers	4.9	392	679	2.0	14
Restaurants	1.9	177	348	1.0	18
Tour operators	1.9	180	304	0.9	16
Travel agencies	1.8	24	327	0.9	18
Common carriers	0.4	193	67	0.2	17
Culture, sport and leisure suppliers	1.0	90	197	0.6	20
Other tourism suppliers	2.3	161	442	1.3	19
Universities, polytechnics	9.0	1,850	4,790	13.9	53
Other educational institutions	2.2	105	220	0.6	10
Students	20.4	3,027	5,429	15.7	27
Management or tax consultants	6.9	644	2,669	7.7	39
Public institutions, pressure groups	2.9	625	1,110	3.2	38
Other organizations/businesses	8.6	4,938	3,064	8.9	36
Private persons	5.4	426	1,141	3.3	21
Total	100.0	25,492	34,538	100.0	35

Note: [1] per December 31, 2001.

Table 3. Origin of TourMIS Users

The acceptance of TourMIS can be determined by means of constantly updated and on-line available access statistics. Contrary to other internet applications the accesses to websites is not counted but the number of virtually answered queries is. Results of the TourMIS statistics are therefore not influenced by website characteristics (number of graphics or distortions due to the application of window techniques), but do represent the 'genuine user acceptance'. In addition, the comprehensive protocol system permits the analysis of que-

ries broken down into various user groups, information sources and the type of query (i.e. textual options for the compilation of tables and reports, data queries, etc.).

The community of TourMIS users has continually developed. In 1998 there were only 50 registered users at the Austrian National Tourist Office and at the end of 2001 more than 1,000 registered TourMIS users have been counted. The distribution of user groups indicates that TourMIS is not only favoured by tourism managers (44.6%), but also by employees, students and pupils of education and research institutes (31.6% of all queries) and other non-tourism professionals or private persons (23.8%). The distribution of various user groups is presented in Table 3. The right hand column of Table 3 shows the average number of queries per user in 2001 and therefore indicates the frequency of use for a specific TourMIS user group. The employees of provincial tourism organizations use TourMIS most (92 queries per user) due to the comprehensive data material available on the federal provinces. The students, as the largest user group, show a relatively low number due to only temporal interest (for a seminar paper or a diploma thesis they need access to data material only once). The number of accommodation providers and F&B managers using the system is, considering the number of existing businesses, very low. A reason for this is probably that the most interesting information source for this user group (the Austrian hotel and restaurant panel database) is a relatively new data set that is simply not known by the managers. Overall, 34.538 queries have been processed in 2001, signifying an increase of 35.5% in comparison to the previous year (25,492 queries). Table 4 presents the significance of the various data sources for information supply.

Sources	2000	in %	2001	in %	00-01 in %
Statistik Austria monthly data	6,510	25.5	6,919	20.0	6.3
ECT	4,568	17.9	6,449	18.7	41.2
ETC	3,773	14.8	6,452	18.7	71.0
Statistik Austria seasonal data	3,120	12.2	5,105	14.8	63.6
Statistik Austria annual data	3,398	13.3	4,495	13.0	32.3
Austrian Guest Survey	2,185	8.6	2,240	6.5	2.5
Austrian Hotel and Restaurant Panel	1,938	7.6	2,094	6.1	8.0
Number of visitors[1]			784	2.3	
Total	25,492	100,0	34,538	100,0	35.5

Note: [1] New source in 2001

Table 4. Usage of TourMIS Sources (sorted by number of queries in 2001)

About half of all queries are made regarding the official tourism statistics in Austria. The industry appears to be very interested in the development of the major markets of origin and accommodation types in the federal provinces (on average approx. 50 queries per day). Regarding the official statistics for Austria most queries are made in connection with information concerning monthly statistics (20% of all queries). The international data sources ECT and ETC gained 18.7% respectively and they rank behind the official Austrian statistics. The significant increase of queries regarding these two international data sources as well as the tendency towards English queries, however, indicate a growing international interest in TourMIS.

The assessment of demand of information certainly needs a more detailed investigation than simply monitoring the current use of market research resources. However, in TourMIS 'demand of information' not only refers to the principal (statistical) sources, but also to the sort of data transformations (analysis) and formats of automatically generated reports available to the users. The functional characteristics and the design of the system have always been developed in close collaboration with the affected managers. For instance, concerning the development of the decision support tools part of the international data sources in the system, the developers have met more than 20 times in form of working group meetings and seminars with representatives (CEOs and research directors) of European Cities Tourism and the European Travel Commission. The involvement of the managers in the design and operation of the information system resulted in favorable user attitudes and perceptions of the information system and led to higher levels of use. In the beginning only a few members were able and willing to actively contribute to this project by entering their data on a regular basis. Today, more than 100 managers working in different tourism destination marketing organizations, based in more than 30 different European countries, and speaking more than 15 different languages, are obviously convinced by the significance of the project and the value of the system as they regularly and voluntarily enter their data into the system.

5 Conclusions

Generally speaking tourism managers benefit from access to the internet in two ways: the internet provides the opportunity to communicate and serves as a platform for new distri-

bution channels. The present article does not deal with new distribution channels and new booking systems in the tourism industry. This undoubtedly important topic has been discussed in an number of publications and symposia (Sheldon 1997, Werthner and Klein 1999). The present article introduced TourMIS, an on-line accessible decision support tool for tourism and hospitality management which has been successfully used by more than 1,000 users for three years. According to Ritchie and Ritchie for the development of an industry supported destination marketing information system, information must be both generally accessible and widely advertised so that managers are aware of the benefits it offers (Ritchie and Ritchie 2002:451). In lieu of a more preferable cost-benefit analysis, the success of TourMIS was analyzed by studying actual system use observed from various log files generated by the system. The merits of this form of evaluation lie in the objectivity of the findings, the cost-effective procedure, and the comparability of the estimates when the analysis are performed on a regular basis.

The major reason for the poor application of management science models and methodologies in tourism management is the insufficient education of practitioners and the inadequacy of problem solving features of standard software solutions. The development of simple, affordable (shareware) programs, downloadable for every tourism manager, is the first step into a new era of dialogue between research and practice. Within a short time, for internal diagnosis, forecasts and simulations on the net there will be high-performance computer languages available which are now being developed by major international software producers.

Technological progress will also offer benefits for the electronic transmission of tourism market research data. Interdisciplinary research projects will be challenged with tourism research, research in statistics and commercial information technology. For example there are still a number of problems to be solved in order to be able to jointly use ecoscopic and demoscopic tourism data within a marketing information system. These combination options require a constant standardization of information sources as well as new approaches towards the methodological processing of data gained from various studies (Froeschl 1997).

Another vital research initiative will be the development of information systems about themselves? Optimizing the knowledge presentation of 'service quality in information services' has been neglected in the past. By applying and accepting decision support systems the significance of this field of research will increase. Another important factor will be the role system imminent? protocol presentations play, which are continually improved. Thus data on the user behavior offers not only information on necessary improvements in the data processing of tourism market research results (Wöber and Gretzel 2000), but also on the future focus of tourism market research.

The sudden explosion of data and the growing need for information challenges basic research as far as data reduction and decision support methods are concerned. Therefore existing concepts for qualitative forecasts and market reaction models and their calibration options in a marketing information system have to be reconsidered. In this respect projects which aim at a systematic and regular compilation of experiences experts made with regard to various technical subjects (i.e. short-term development of singular markets of origin) are considered to be promising. It is their aim to provide an improved evaluation of future market developments and eventually to integrate the findings into the strategic planning of national and regional tourism organizations and businesses.

Another necessary development regards already existing data collections and the processing of the European cities` statistics. In this respect this author has observed many shortcomings relating to the international comparability of the data. The improved communication possibilities provided by the new medium stimulates critical discussions and behavioural learning among all participants. Within European Cities Tourism, among other things, new initiatives to evaluate one city's major competitors have been released due to the managers' increased awareness of the importance of this problem.

The trend towards globalization in research, where the internet plays a vital role, refers also to tourism research. To those critics who refer to the internet as uncontrolled growing, complicated and in its applications too playful, supporters used to point out that one day smart and profitable applications would be found. That is where we stand now. The new areas of responsibility regional and national tourism managers are confronted with today,

not only suggest shortcomings in education but also promise new opportunities for the next manager generations to acquire status.

References

Albert, H. (1967) *Marktsoziologie und Entscheidungslogik*. Neuwied am Rhein: Berlin.

Calantone, R.J. and Benedetto di C.A. (1991) Knowledge acquisition modeling in tourism. *Annals of Tourism Research*, 18(2): 202-212.

Davis, F.D. (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13: 318-340.

Eierman, M.A., Friedman, F. and Adams, C. (1995). DSS theory: A model of constructs and relationships. *Decision Support Systems*, 14: 1-26.

Froeschl, K.A. (1997) *Metadata Management in Statistical Information Processing*. Springer: Wien-New York.

Hebestreit, D. (1992) *Touristik Marketing. Grundlagen, Ziele, Basis-Informationen, Instrumentarien, Strategien, Organisation und Planung des Marketing von Reiseveranstaltern. Ein Handbuch für Praktiker.* Berlin Verlag: Berlin.

Hruschka, H. and Mazanec, J.A. (1990) Computer-assisted travel counseling. *Annals of Tourism Research*, 7(2): 208-227.

Little, J.D.C. (1970) Models and managers. The concept of a decision calculus. *Management Science*, 16(8), 466-485.

Mazanec, J.A. (1986) A decision support system for optimizing advertising policy of a national tourist office. Model outline and case study. *International Journal of Research in Marketing*, 3, 63-77.

Mazanec, J.A. (1994) International tourism marketing - adapting the growth share matrix, in: J. Montana (ed.), *Marketing in Europe, Case Studies*. Sage Publications: London, 184-203.

Mazanec, J.A. (1998) International tourism marketing: A multi-factor portfolio model, in: Hartvig-Larsen, H. (ed.), *Cases in Marketing*, Sage Publications: London, 115-141.

Middelkoop, M. van (2001) *Merlin: A Decision Support System for Outdoor Leisure Planning. Development and Test of a Rule-based Microsimulation Model for the Evaluation of Alternative Scenarios and Planning Options*. Phd thesis, Technical University Eindhoven, Netherlands.

Phillips, P.A. and Moutinho, L. (1998) *Strategic Planning Systems in Hospitality and Tourism*. CABI: Wallingford.

Rita, P. (1993) *A Knowledge-Based System for Promotion Budget Allocation by National Tourism Organizations*. Doctoral thesis, University of Wales, College of Cardiff.

Ritchie, R.J.B and Ritchie, J.R.B. (2002) A framework for an industry supported destination marketing information system. *Tourism Management*, 23: 439-454.

Seitz, E. and Meyer, W. (1995) *Tourismusmarktforschung*. Vahlen: München.

Sheldon, P. (1997) *Tourism Information Technology*. CABI: Wallingford.

Statistik Austria (2001) *Tourismus in Österreich*. Statistik Austria: Wien.

Venkatesh, V. and Davis, F.D. (2000) A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science*, 46: 186-204.

Walker, P.A., Greiner, R., McDonald, D., and Lyne, V. (1999) The tourism futures simulator: A systems thinking approach. *Environmental Modelling & Software*, 14: 59-67.

Werthner, H. and Klein, S. (1999) *Information Technology and Tourism – A Challenging Relationship*. Springer: Wien-New York.

Wierenga, B. and van Bruggen, G. (2000) *Marketing Management Support Systems. Principles, Tools and Implementation*. Kluwer: Boston.

Wöber, K.W. (1998) TourMIS: An adaptive distributed Marketing Information System for strategic decision support in national, regional, or city tourist offices. *Pacific Tourism Review*, 2(3/4), 273-286.

Wöber, K.W. (2000) Standardizing European city tourism statistics. *Annals of Tourism Research*, 27(1), 51-68.

Wöber, K.W. and Gretzel, U. (2000) Tourism managers' adoption of Marketing Decision Support Systems. *Journal of Travel Research*, 39(2), 172-181.

Wöber, K.W. (2001) *Betriebskennzahlen im österreichischen Gastgewerbe. Bilanzjahr 1999*. Österreichischer Wirtschaftsverlag: Wien.