THE IMPACT ON TOURISM MARKETING OF THE USE OF INTERACTIVE DIGITAL MAPS THROUGH THE CONTRIBUTION OF G.P.S. AND G.I.S. TECHNOLOGIES TO COMBINED INFORMATION

PANAGIOTOPOULOS Eleftherios[1], KARIOTIS Georgios[2], KARIOTOU Glikeria[3], KARANIKOLAS Nikolaos[4]

(1) Applications Professor
Geoinformatics and Topography Section of the Serres Technological Educational Institute (TEI)
Terma Magnisias, Serres, tel. +23210-49247, e-mail. epanag@teiser.gr

(2) Applications Professor
Geoinformatics and Topography Section of the Serres Technological Educational Institute (TEI)
Terma Magnisias, Serres,, Τηλ. 23210-49247, e-mail. gkar@teiser.gr

(3) Laboratory Collaborator
Geoinformatics and Topography Section of the Serres Technological Educational Institute (TEI)
Terma Magnisias, Serres, Τηλ, 23210-49155, kargly@teiser.gr,

(4) Scientific Collaborator
Geoinformatics and Topography Section of the Serres Technological Educational Institute (TEI)
karanik@auth.gr

Summary

This paper attempts to evaluate the possible impact of the creation of an interactive Digital Tourist Map on tourism related marketing in the current period, after data weighting and with the use of modern state of the art technologies (GPS and GIS), aimed at the dissemination of combined information through the internet. We believe that the creation of the appropriate digital map infrastructure may be adapted for use with three platforms, i.e. multimedia, internet and mobile, conforming to end user's preferences.

The promotion of an area through tourist activity contributes to a sustainable spatial development and the protection of both cultural heritage and the natural environment. At the same time, it indirectly underlines the need to take necessary action to complete the transportation networks.

Tourism marketing is a continuous procedure through which enterprise management plans, investigates, develops, controls and evaluates activities, aimed at satisfying both customer needs-desires, as well as the company's operational objectives.

In recent years, new forms of tourism have been significantly developed, forms that are differentiated from the mass, sight seeing type of tourism. These new forms of tourism, referred to as special, alternative tourism forms, also include a sight seeing tourism quotient. Basic qualifications for a successful management of a tourism office include a high level of knowledge on tourism and continuous updating, involvement in the tourism "industry", knowledge of tourism law, an ability to apply the 4 strategic factors of tourism marketing, which must additionally be combined with the 4 traditional factors used to satisfy customer needs.

The combination of the above, facilitates the exploitation of such applications on the internet, in order to allow for the expansion of potential markets, to facilitate closer contact with customers and, through geographical and descriptive information, to minimize the "intangible" nature of tourism services, to put together successful "packages" with good timing, as well as to promote partnerships.

This paper's interactive tourist map consists of a set of thematic maps managed by a combination of databases, in order to be able to meet end user requirements both concerning search inquiries as well as concerning site promotion and sight seeing inquiries. Main thematic categories dealt with concern data related to Historical, Environmental, Athletic, Religious and

Therapeutical content, with thematic subcategories inserted in relation to specific features of the points of interest. The combination and integration of these with the use of GIS software results in the particular information sought by the user and this information is then projected spatially, coupled with the ability also to receive descriptive data. Map background will also include road, railroad and waterway networks, names and positions of cities and settlements, and will be able to project in four levels spatial information of which, on the 4th level, only information on sites selected by the particular user will be presented. Additional features, point or linear, are realized with the use of GPS.

Work is undergone within the framework of the Research Program "Man made environment and its documentation through G.I.S. Spatial development, Roads and itineraries in the Balkans", funded via the "Archimedes: Support for research groups in TEIs (EEOT)" act, and conducted by a group of scientists of the Geoinformatics and Topography Department of the Serres Technological Educational Institute (TEI).

Data

Appraising the combination of tourism management data analysis and an investigative approach through the use of questionnaires, should result in the definition of points to be included in the interactive tourist map. The use of such map will probably improve related services rendered and minimize consumer uncertainty.

The 4 strategic traditional factors of marketing are: **product**, **place**, **promotion** and **price**. Regarding tourist marketing, Morrison [1] included 4 additional factors: **people**, **packaging**, **programming** and **partnerships**. While a sales procedure focuses on the needs of sellers, marketing focuses on the needs of buyers.

Tourism **product** is a set of goods and services consisting of physical data, tangible goods, intangible goods and facilities. It is of interest to the tourist-consumer, the producer and the competent relevant state entities.

The consumer-tourist evaluates the **product** offered according to
- ✓ Features influencing his/her decision (natural and historical data, form of tourism, climate conditions etc.)
- ✓ Facilities in place (accommodation, entertainment)
- ✓ Access means and potentials

The producer of the **product** operates based on such factors as shown below
- ✓ Natural (geographical location, environment, climate)
- ✓ Social (language, history, man made accomplishments etc)
- ✓ General infrastructure and –built- superstructures (accommodation, entertainment, sports facilities)
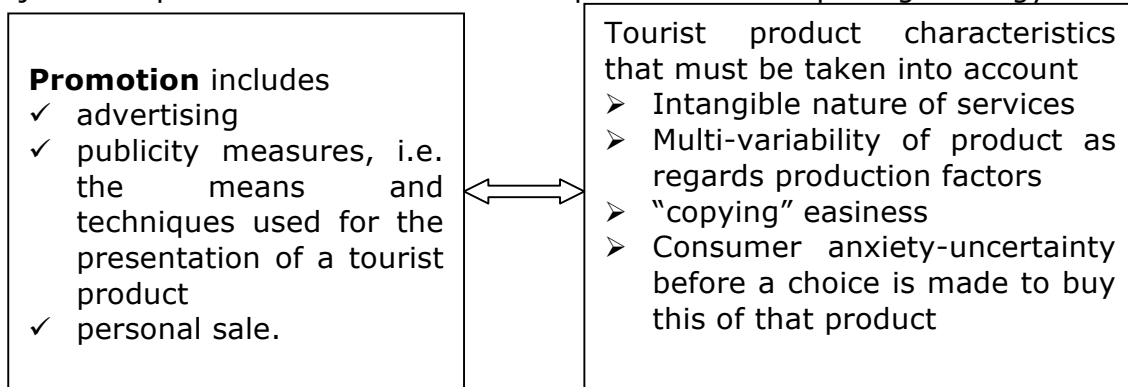- ✓ Events, hospitality

Within the framework of tourist attraction, agencies invest in
- ✓ Highlighting and promoting natural and cultural features
- ✓ Realization of infrastructure works
- ✓ Measures for improving transport, people access and information.

The **area**, the itinerary and especially the points of interest are descriptively defined in printed form. Such descriptive information may at times be additionally accompanied by small scale maps without the ability to offer combined information. Descriptive information is kept very brief, almost limited to site names, with minimal photographic material, due to high printing

costs. To a large extent there is no correspondence with map material distributed.

Pricing constitutes one of the most important elements to address competitors and enhance quality upgrading. Appropriate information and programming in the creation of a tourist product play a decisive role in assuring high quality standards, a good price-quality and operational objective – price combination for the implementation of pricing strategy.

Promotion includes ✓ advertising ✓ publicity measures, i.e. the means and techniques used for the presentation of a tourist product ✓ personal sale.	Tourist product characteristics that must be taken into account ➢ Intangible nature of services ➢ Multi-variability of product as regards production factors ➢ "copying" easiness ➢ Consumer anxiety-uncertainty before a choice is made to buy this of that product

It is **individual persons** (customers, service providers) that to a significant degree make the difference between success or failure in a given tourist procedure. It is possible for a customer, based on incomplete information, to form misconceptions about a particular product, while the provider may not possess the infrastructure necessary to proceed (from the office, before the realization of the product) to a detailed briefing of the customer about day to day scheduled events and any possible alternatives that may be available to the customer. This represents a main reason for the expression of consumer uncertainty.

Packaging is defined as the combination of related and complementary services in a single price offer. Successful **packages** include such features as
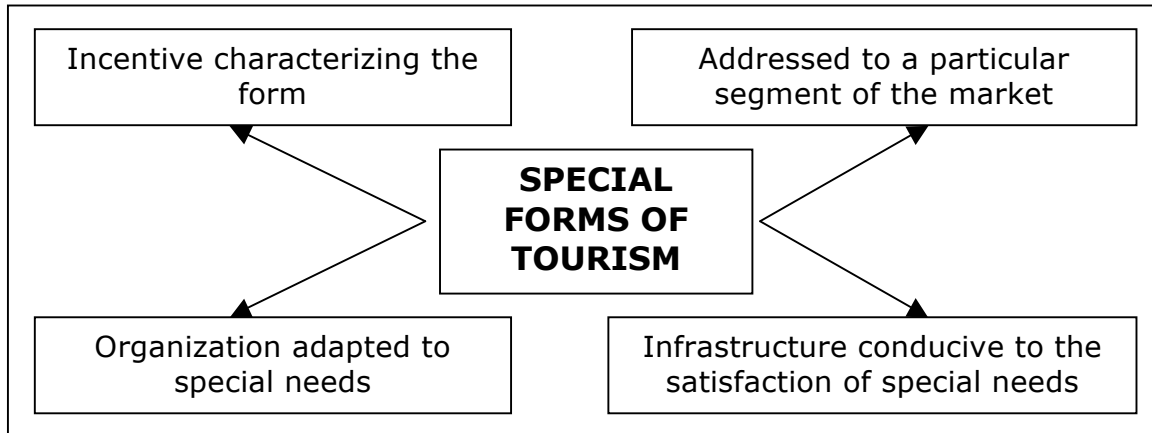- ➢ Attractive sites or demand creators (e.g. reduced prices, multimedia material for the trip including itinerary, accommodation details), points of interests, proposed alternative sites and routes, free time filling suggestions, information on access time and cost of visits to museums, galleries etc.
- ➢ A sense of customer importance (an impression that customers will get more for the money they spent, e.g. a wider variety of features offered by the package).
- ➢ Consistent quality and compatibility (there is a tendency to judge package experience based on expected quality or inconsistency)
- ➢ Good organization and coordination (meeting customer needs)
- ➢ An offer of some particular benefit to the customer (some additional service or activity at no extra charge)

Programming is a technique related to packaging. It combines parallel activities, events or programs in order to assign addional attraction to some package. Integrated data are an ideal element of choice.

Partnerships of various types have also become very popular in the field of travel, either concerning joint promotion, or concerning other joint activities. This is due to the fact that these schemes offer quite a number of benefits to parties involved. Two of these interesting benefits are access to customer data bases of the partners, and access to the partners' special knowledge and/or expertise.

The emergence of specialized and alternative tourism (agro-tourism, eco-tourism, action tourism, religious, cultural, therapeutical, congress, business, fair-related tourism etc.) has acquired a wide variety of earnest followers and supporters belonging to a wide spectrum of social groups and movements that seek quality travel services and are interested in linking stays at a certain locality with a familiarization to local or indigenous culture [2].

There are four basic characteristics defining special forms of tourism

```
┌─────────────────────────────────────────────────────────────────────┐
│  ┌──────────────────────────┐        ┌──────────────────────────┐    │
│  │ Incentive characterizing │        │   Addressed to a         │    │
│  │       the form           │        │   particular segment     │    │
│  │                          │        │   of the market          │    │
│  └──────────────────────────┘        └──────────────────────────┘    │
│                    ╲        ┌──────────────┐       ╱                  │
│                     ╲       │   SPECIAL    │      ╱                   │
│                      ╲      │  FORMS OF    │     ╱                    │
│                      ╱      │  TOURISM     │     ╲                    │
│                     ╱       └──────────────┘      ╲                   │
│  ┌──────────────────────────┐        ┌──────────────────────────┐    │
│  │  Organization adapted to │        │ Infrastructure conducive │    │
│  │     special needs        │        │  to the satisfaction of  │    │
│  │                          │        │     special needs        │    │
│  └──────────────────────────┘        └──────────────────────────┘    │
└─────────────────────────────────────────────────────────────────────┘
```

Source : Velissariou, E (2000), "Tourism and Tourist Facility Management", vol. 4, Elliniko Panepistimio, Patras

Differences between mass tourism and special and alternative tourism: Tourist intensions

Mass tourism	Special and alternative tourism
Tourist intensions	
Mass tourism	Traveling alone, with friends or family
Lack of time	Plenty of time
Fastest transportation means	Appropriate, or even slow transportation means
Predetermined itinerary	Impromptu itinerary
Externally inspired	Internally (self-) inspired
Imported way of life	Domestic way of life
"Spectacles"	Life experiences
Comfortable and passive	Active and energetic
Limited or no prior mental preparation	Prior research on the destination
No wish to learn the language	Learns to use the language
Sense of superiority	Will to learn, acquire knowledge
Various purchases	Gift purchases
Souvenirs	Memories, diaries, new prespectives
Instant photographs and tourist cards	Photographs, paintings
Curiosity	Finesse
Noisy	Quiet

Source : Krippendorf (1982). As referred in Andriotis, K. [4]

The "widening of the gap" among the above mentioned forms of tourism may be minimized with the advantages that come about through the utilisation of the **internet**. These advantages represent a benefit not only to professionals of the field, but to consumers as well. This is because:

- Interactive capability facilitates the development of an inter-personal as opposed to wholesale, mass communication of global dimensions, allowing for designing and implementing a complete vacation "package".

- With the functioning and maintenance of databases, relevant information and the combination of geographical and descriptive information is realized in real time, affording the possibility of alternative scenarios and multifaceted information.
- Printing, postal and personnel costs are drastically reduced with the creation of virtual offices.

New technologies haven't changed the rationale and reasons for which people buy product and services. They simply modified the manner in which people satisfy such needs (p. 86)[5]. The internet must be considered as a marketing tool and not as a sales channel. As internet use expands, the use of all mass communication media is generally transformed. Only agencies that possess the required know-how and provide specialized services are expected to survive and further develop.

Application study area

For the application-study we selected an area around the seat of the Serres TEI, consisting of segments of three countries in the southeastern part of the Balkan peninsula. From Greece, we included Central and Eastern Macedonia and Thrace, from Turkey its European part and from Bulgaria its southeastern part. The study area is delimited by four large urban areas, those of Thessaloniki, Constantinople, Varna and Sofia.

The future of the study area as well as that of the wider Black Sea area is connected, by necessity, with the design and expressions of the new European architecture that increasingly moves toward a type of confederation of states or regions.

Research - Methodology

Within the framework of this work, we evaluated the findings of a related questionnaire survey that has been conducted among 77 tourist agencies in 2005 by the Business Administration Section of the Serres TEI. The Geoinformatics and Topography Section of the SERRES TEI have also conducted a new survey among 106 tourist agencies. This latter survey was completed in April 2007.

The aim of the 1st survey was to define the spread of internet use and the relative maturity of web pages utilized by tourist agencies. About 50% of respondents had university education while only 7.8% possessed a Master or Doctoral degree. 94.7% of respondents makes use of the internet as a means to publicize and promote services offered and 75.3% of them have designed and realized their own web page. Results concerning web page visits per month were as follows: more than 650 visits 25.9%, between 450 and 650 visits 3.7%, between 250 and 450 visits 14.8%, between 50 and 250 visits 42.6%, less than 50 visits 13.0%.

Summing up the "I agree" and "I absolutely agree" replies in the thematic content of questions on the perception of tourist agencies regarding the performance and effectiveness of web marketing, it seems that respondents are positively inclined toward the following issues: (a) 74.6% of them for the liberalization of tourist product market, (b) 80.2% for the completion of all related transactions through interactive online services, (c) 72.0% for the achievement of lower costs through labor savings. However, regarding the standardization of travel products, only 47.4% of respondents has a positive view.

In the thematic content among the 14 questions on marketing methods:

a) if replies "always" and "often" are summed up, then the company **uses** (i) in 93.3% of the cases the impressions of former customers, (ii) 79.4% catalogues, (iii) 76.7% the internet.

b) if replies "high" and "moderate" impact are summed up, then impact on sales is attributed (i) in 90.4% of the cases to impressions from former customers, (ii) 78.1% to the internet.

Among 10 questions on web page content, replies concerning virtual information (maps, virtual tours) are ranked 8th with just 32.5% in relation to information on product sales, reservations and prices

The **2nd survey** aimed at recording the present situation as regards the movement of tourists in the study area, the manner of tourist product promotion and the intentions to provide tourists with spatial information (map material) linked to descriptive information (text, images) through the use of computers. This material would then be available to interested parties at tourist agencies in order to limit customer uncertainty. 180 questionnaires have been distributed, 106 were answered and returned. The contribution of students of the Geoinformatics and Topography Section to the task of questionnaire formulation and distribution has been significant.

The analysis and evaluation of results are of course not an end to itself for the present study. However, data shall indeed by used to show the current situation as well as what the market tends to expect from application implementation. The survey is divided into four parts. Some documentation data is provided below:

The 1st part includes a briefing note and contains six (6) questions of a general nature related to the company, in order to allow for assigning weights to company replies during the stage of results evaluation (e.g. company legal form –individual, S.A. etc.–, years of active market engagement, company owned buses, whether the company organizes tours by itself or in cooperation with other travel agencies). 58.9% of total are individually owned [*"personal" under Greek law*] and 23.3% of total respondents are small companies, 74.8% of companies are active in the market for over ten years while 86.3% of them have company owned buses. 69% of these agencies organize and conduct more than 40% of travel tours.

The 2nd part provides the thematic content to be included in the digital map, distinguishing such categories as natural and man made environment (with 5 subcategories) and intends to measure and appraise the knowledge of travel agents about the points of interest within the study area. It contains seven (7) questions on multiple points (about 30) in E. Macedonia, Thrace, Bulgaria and Turkey (its European part) by category and event. The questionnaire asks travel agency personnel to evaluate these points of interest. While answers of travel agents for points of interest in a given particular country reaches 70% [*maybe as an expression of travel agency specialization in that country*], the knowledge base of agents for points of interest in all three countries merely reaches 33%.

The 3rd part contains nineteen (19) questions that aim to assist in recording destinations, personal interests of Greek and foreign tourists, execution of individual or agency-organized travel tours, provision of map material to end users of tourist services. The four (4) last questions intend to provide insight for the intentions of travel agents about the institution of a work position in their firm related to the operation of a computer-based

interactive digital tourist map at the disposal of customers and the public. East Macedonia and Thrace show up to 10 trips per year (72.7%), South Bulgaria (77%), Turkey (58.7%). Of these, only 8% are trips made by individual persons (as opposed to group trips).

Only 41.8% of agencies provide tourists with itinerary maps for Greece and Bulgaria and 54.9% for Turkey. Regarding maps of cities to be visited, the respective percentages are 33.3% for Greece, 37.3% for S. Bulgaria and 43.7% for Turkey. Concerning question fourteen (14) about whether travel agencies dispose digital (computer based) maps for use by customers, positive responses were: 59.4% for E. Macedonia and Thrace, 54.4% for S. Bulgaria and 60.2% for Turkey. Available descriptive material (historical information, photographs etc.) is more readily available: E. Macedonia and Thrace 72%, S. Bulgaria 67.8% and Turkey 68.5%, respectively.

Concerning question sixteen (16) "How do you evaluate the effort to create an electronic map showing historical and religious monuments, points of special natural beauty, roads and waterways, cities and settlements, with the capability to show a set of information for any particular point of interest at the push of a button?", if responses "excellent" and "very good" are summed up then respective responses amount to 92.6% for E. Macedonia and Thrace, 90.2% for S. Bulgaria and 90.7% for Turkey.

Regarding question seventeen (17) "If you were to organize a trip, whether on an individual or group basis, with the possibility to choose one or more types of tourism forms, would it help if you had available a digital, computer based map from which you could easily draw information?", if responses "very considerably" and "considerably" are summed up then respected responses amount to 93.8% for E. Macedonia and Thrace, 93.5% for S. Bulgaria and 92.8% for Turkey.

Concerning question eighteen (18) "Do you consider that a high-quality conducted tour must be a first priority target for travel agencies because it is positively evaluated by participating tourists and represents good promotion for your company?", if responses "very considerably" and "considerably" are summed up then respected responses amount to 98.9% for E. Macedonia and Thrace, 97.7% for S. Bulgaria and 97.8% for Turkey.

As for question nineteen (19) "If an interactive map in DVD form were available, would you provide a P/C position in your office to be used for briefing by customers interested in acquiring information about the area of his/her intended trip, thus also promoting your company?", the response "absolutely, and I would allow for a position and also provide the DVD" applies to 41.1% of respondents for E. Macedonia and Thrace, 39.3% for S. Bulgaria and 37.6% for Turkey. Response "I would allow for a position" the respective percentages amount to 29.5% for E. Macedonia and Thrace, 24.&% for S. Bulgaria and 26.9% for Turkey.

In the 4th part of the study, where the person managing the travel agency was given the opportunity to fill in his/her views, most frequent responses recorded include such comments as: briefing in the questionnaire's points of tourist interest, city maps and distances to points of interest, consular offices, therapeutic facility (spa) destinations, monuments, museums, cultural events and hotel photographs.

Methodology

The creation of the digital interactive tourist map represents an interdisciplinary object of many specializations. This is so because data selection, processing and filing requires the utilization of particular techniques and technologies in order to provide easily accessible and high-quality information to the user. The combined model is shown in the diagrams below.
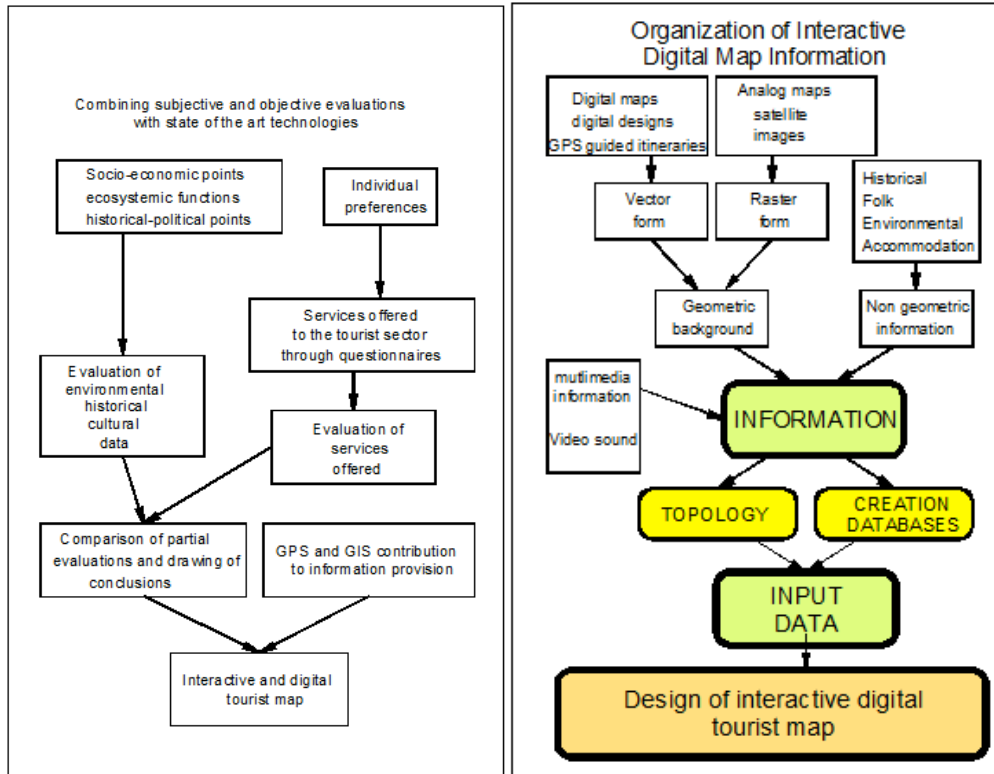
Points of interest have been divided in two categories: natural environment and man made environment. There are six (6) subcategories in total. Criteria for categorizing points of interest are related to the interests of the tourist traveler, as indicated by the above mentioned survey. While using the interactive map, the user will be able to select the entire category and/or particular points chosen from one or more categories. In this way, the itinerary/ries that will finally be derived and their related information will best correspond to the user's own wishes.

Information generalization follows classification into three levels: **Very Interesting, Particular, Specialized**.

Natural Environment Categories
11. Water Habitats
12. Forests
13. Hiking trails
14. Caves
15. Waterfalls
16. Forest Settlements
17. Picturesque ports
18. Picturesque lakes
19. Environmental education centers

Man made environment categories	
Religious centers, monuments	**Historical monument agglomerates**
21. Byzantine churches	31. Archeological sites
22. Monasteries	32. Ancient cities
23. Religious centers	33. Archeological museums
24. Mosques	34. Theaters
25. Religious museums	35. Castles
26. Hebrew synagogues	**Athletic Centers**
27. Catacombs	41. Winter sport centers
28. Schools	42. Rafting locations
	43. Mountain climbing locations
	44. Motor sport centers

Traditional settlements, buildings, art	Events
51. Traditional settlements or portions of settlements	61. Carnivals
52. Traditional buildings	62. Youth events
53. Art galleries	63. Sound and light
54. Folk art museums	64. Bare foot fire walking (anastenaria)
55. Parks and squares inside or outside cities	65. Traditional folk dances
	66. Folk trade fairs

Descriptive information of interest to the average user is divided into: **general** (country, location, name of site or monument, use, administrative information, climate data), **historical, archeological, architectural, folk customs related, environmental, pictures, sketches, data sources related**.

Highlighting of the location of these points of interest will be done through the use of specially designed icons that must be generalized according to map scale changes selected by the user. This is an important object for information rendering in graphical form, in order for the information to be easily understood by the user.

The digital interactive map must satisfy the following necessary conditions:

- It must offer the user the opportunity to form a realistic, to the extent possible, picture for the object (*diminution-magnification of an area with finite boundaries, due to the underlying digitized information*), offering to the user an immediate, computer-aided contact with the point of interest selected.
- The entire set of partial information must be directly and immediately available to the user.
- The map must provide a topological organization and management of all the information, with a definition of relationships among partial elements that form user wishes.
- The map must allow for correlations between vector structured graphical data (*designs and maps*) and digitized data (*photographs and video images*).
- The map must be user friendly and facilitate information extraction from its briefing system.
- The map must allow for correlations between a given point of interest and its surrounding area.
- The map must incorporate a higher accuracy of geometrical data (data entry with GPS and vector data).

CONCLUSIONS

In order to describe over time an historical, geographical area and highlight the possibilities for cross-border cultural communication, it is reasonable to seek and locate the axes – trails that have crisscrossed this area through the ages.

In the case of conventional such information, it is printed material maybe accompanied by photographs and an accompanying map that plays the role of documentation. In the case of digital information, the digital map forms the base to which all descriptive information is linked. In contrast to conventional user briefing, digital briefing of users has the advantage of a single, integrated management of all data in a computer environment. This allows for increased accuracy of geometric and thematic data to be collected. It also allows for an increased density of information. The contribution of GPS in localizing particular points and sites on the mapping background or in the recording of trails not shown in diagrams, is crucial in the process of digital map creation. The use of GIS is of paramount importance for the successful interactive functioning of the digital map, where all information becomes more "real" through the use of graphical data.

The creation of an interactive digital tourist map allows the end user to take a "virtual tour" without leaving the tourist agency, at the same time having access to all available information on a particular point of interest and any additional related data.

Bibliography

1. Morrison, M. Alastair, (2001), "Tourist and Travel Marketing", Athens, Kleidarithmos publications, 3rd ed. (in Greek)
2. Tsartas, P., (1996), "Tourists, Trips, Places: Sociological Approaches to Tourism", Exantas, Athens (in Greek)
3. Velissariou, E. (2000), "Tourism and Tourist Installation Manamgement", vol. 4, Elliniko Panepistimio, Patras (in Greek)
4. Andriotis, K. (2003), "Alternative Tourism and its Differenciating Characteristics", TOPOS Review of Spatial Development, Planning and Environment, 20-21/2003 ISSN 1105-3267 pp. 139-154 (in Greek)
5. Sakellaridis, D. (1999), "Informatics in Tourism", vol. 4, Greek Open University, Patras (in Greek)
6. I.C.A. Workshop, (1996), *«Electronic Atlases and Cartographic Multimedia Products from CD-ROM to Internet»,* Workbook.
7. Monmonier S. Mark, (1982), *"Computer-Assisted Cartography, Principles and prospects"*.
8. Ormeling F., (1993), *«Ariadne's Thread – Structure in Multimedia Atlases»*, Proceedings 16th ICA Conference, Koeln, pp. 1093-1100.
9. Schneider Barbara, (1999), *«Integration of Analytical GIS-Functions in Multimedia Atlas Information Systems».*
10. Karanikolas, N. and Papadopoulos, K., (2000), "Electronic Atlas of the Island of Lesvos", Proceedings of the 7th National Congress of Cartography, XEEE, Mitilini (in Greek)
11. Karanikolas, N., Miridis, M., (2000), "Symbols and Graphism in Thematic Maps: an Intertemporal Approach", 6th National Congress of Cartography, XEEE, Athens (in Greek)
12. Karanikolas N., Papadopoulos, K., (2000), "The Use of Multimedia Technology for the Presentation of Urban Information. A Cartographic Approach", Proceedings of the 6th National Congress of Cartography, XEEE, Athens, 22-24, pp. 389-398 (in Greek)