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Università Cà Foscari di Venezia



Massachusetts Institute of Technology
(M.I.T.)

HISTORY UNWIRED: VENICE FRONTIERS
Mobile Technology for Intelligent Tourism and Citizenship

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Executive Summary

Venice is a fragile city, both culturally and environmentally. The streets flood with water and with tourists. We have begun to draw a blueprint of how a **community-centered** approach to mobile technology design might conserve the historic feel of Venice, while enhancing convenience, learning, and interaction in the city's historic center.

Our findings were:

1. In developing a meaningful mobile information system, **local expertise** should play a significant role, in content development, dissemination, and ongoing improvement of the system. Such a process would coalesce with the **workforce training** and **infrastructure improvement** plans for the city.
2. **Wi-Fi is coming**, be location-aware. Wireless networks (or Wi-Fi, specifically known as 802.11b) are coming to more and more locations in Venice. Just as the initial Internet boom changed the way tourists shop, make hotel reservations, create itineraries, and stay in touch with friends, so this new extension of the Web will serve those functions. This means that hotel, restaurant, and tourism websites should create mobile versions of their websites. This isn't just create mini-web pages, but redesigning content to take advantage of location-awareness, telephony, and peer-to-peer features of mobiles.
3. Tourists as "**Dynamic Citizens**": We believe that a successful mobile information system will offer tourists ways of getting civically involved, even after they leave the city. In such a model, tourists move from being mere economic units in the civic registry to knowledge-units in a global effort to increase the flow of information across borders.

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History of History Unwired and Acknowledgements

The project started in January, 2003 as an educational uses for mobile technology brainstorming session between Cristobal Garcia, Neeti Gupta, Michael Epstein, and Yannis Zavoleas. Then in February after a brief discussion in a bar with CMS visiting scholar Filippo Dalfiore, the seeds for History Unwired were planted, featuring Venice as a test bed. After receiving last-minute funding from MIT Italy Program, Regione Veneto, and the Venetian Hoteliers Association, we went to Venice for the summer to do an ethnographic study of tourist behavior, information devices-in-use and civic development.

We are indebted to a number of people and organizations who have helped bring this project to fruition. We want to thank Serenella Sferza and Richard Locke from MIT Italy Program for travel financial support, William Uricchio, Susan Stapleton, Neeti Gupta and Yannis Zavoleas from MIT Comparative Media Studies for their feedback and administrative support; Betsy from the MIT Writing and Communication Center for helping us in the editing process of this second version; Tad Hirsch from MIT Media Lab for his feedback about our project and Christopher Rosenquist from the Stockholm School of Economics for his ongoing interest and thoughtful advice.

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Cambridge, MA, November 2003

1. INTELLIGENT MEDIA FOR INTELLIGENT TOURISM

1.1. BUILDING INVISIBLE CITIES

“Memory’s images, once they are fixed in words, are erased,” Polo said. “Perhaps I am afraid of losing Venice all at once, if I speak of it.”

Italo Calvino, *Invisible Cities*.



Venice, like many international tourist zones, is caught in an interesting moment of both global consciousness and local preservation. To the tourist, the city seems to defiantly buck the future and remain unchanging. The city is designed for reflection, from the balcony of boat buses chugging down the Grand Canal

Saint Mark's Place and Palazzo Ducale

at night or in early morning conversations on the *pontes*. On the other side of this reflection is local life—a living city with daily tasks and concerns.

As with many tourist cities, presenting an appealing urban environment to tourists often means corralling local life. Over 150 years ago Frances Trollope commented that Venice “deserves something better than to be kept as an antiquated toy, for the amusement of traveling ladies and gentlemen.” (As quoted in Buzard, 1993) Beyond this process of Disneyfication, “toying” with Venice has led to a deeper loss—its citizens. Due to overcrowding, pollution, overpriced housing, general stress, rude tourists, transportation congestion, and other burdens from rampant tourism, locals are disappearing. The historic center of Venice has gone from 175,000 residents in 1951 to

64,000 in 2002¹. A good deal of its buildings are empty most of the time and even during the whole year.

Information campaigns have been deployed to try and create a Venice that is livable for locals and enticing for tourists. In addition to the many maps, pamphlets, guidebooks, and magazines the Venetian government publishes, it is now distributing a list of “10 Commandments for the Intelligent Tourist.” On plaques and flyers throughout Venice one can find this “Decalogue” calling for more respect for local traditions, public behaviors and for fostering interest in less touristy parts of Venice.



- 1 Get a map of the city and remember that Venice is much more than just St. Mark's Square.
- 2 Show respect for the city by helping us keep it clean: never throw litter on the ground or into the canals.
- 3 Always wear appropriate clothing. Keep right when walking in the city street. Never stop on bridges. Take off your backpack when on the city boats.
- 4 Remember that St. Mark's Square and the surrounding area is an open-air museum (people who picnic in the square and leave litter behind will be subject to **fines**).
- 5 Get a **Venice Card** and use it. The Card offers many advantages and can help us to make you feel welcome in Venice.

¹ Resident population in the territory of the Municipality of Venice, source: <http://www.comune.venezia.it>

- 6 Only use authorized services and transportation. Always ask what the fare will be before boarding.
- 7 Beware of unauthorized peddlers and watch out for pick-pockets.
- 8 Venice is subject to frequent **flooding**. A warning siren announces exceptionally high tides. You can still visit many areas of the city by using the wooden walkways.
- 9 The city also has disabled access routes. For more details contact the **APT** or **Informahandicap**.
- 10 To exercise your rights or lodge a complaint, contact the **APT Complaint Office** or the **Counter of Tourist Mediation**.

Figure 1 Venice's Decalogue

The Decalogue tries to brand this tourist campaign as “intelligent tourism.” (Comune website) This word is echoed in the civic programs intended to create an “intelligent” workforce². In addition, programs such as the proposed *Parco Scientifico e Tecnologico*³ *l’Arsenale* (the old Arsenal)⁴ are aimed to create an “intelligent” infrastructure. This plan calls for the renovation of an old naval arsenal into a high tech research center. That is to say, the park will stand as a node of innovation in southern Europe (and northern Italy) not only for high tech products but also for the art scene and cultural networks within Venice.

In the words of the City’s Strategic Plan, the city is trying to “create a contemporary city...Venice should become a hotspot for European and International organizations” (*Venice Strategic Plan*, 2003). This call for “social intelligence” finds an interesting overlap, we believe, with mobile technology.

² Venice’s work programs include incentives to move away from tourist products, to local services such as home supplies, repairs, and IT.

³ *Venice Gateway for Science and Technology*, see <http://www.vegapark.ve.it/vega/navig/jsp/index.jsp>

⁴ See http://www.venicedistrict.it/ita/pa_arsenale.asp

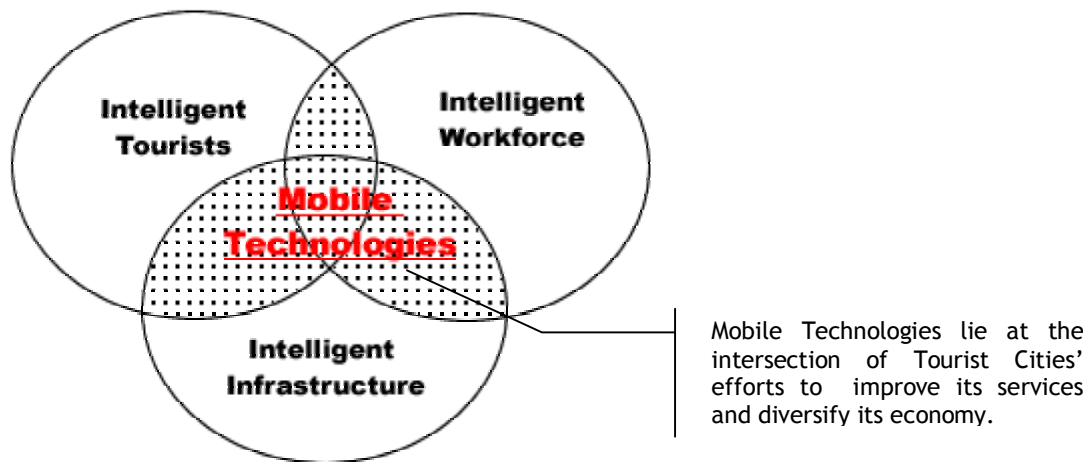


Figure 2: The intersection of mobile technology and municipal programs in Venice.

Already, guidebook publishers such as Lonely Planet are moving into mobile technologies by putting some of their available content in mobile technology platforms (Palm Pilots). However, none has coordinated this tourist content with civic needs and technological capabilities. In this study we explore the means by which Venice can provide **tools rather than rules** for intelligent exploration and exchange within tourist zones.

An advanced mobile technology network could be a strong foundation for the digital cities of the future, attracting modern businesses and high tech events to cities already accustomed to receiving large numbers of visitors such as Venice, Cannes, London, Barcelona, among others.⁵ Beyond these practical concerns, a well-designed system might also create a whole new type of travel and “dynamic citizenship” based on concepts ingrained in the new European demographic trends and current global culture.

1.2. Building Wireless Media in the Information Age

In a time of European change and, especially, in cities with visitors from all over the world, there is a need to mesh the local needs with global culture. In our vision of a

⁵ Another MIT team lead by William Mitchell and C.F. Raffi is developing a much broader urban renovation in Cannes, including new urban design, wireless technologies and architectural renovation.

successful mobile information system, tourists have the opportunity of getting civically involved with the places they are visiting, even after they leave the city. Tourists become **Dynamic Citizens**. They are more than mere economic units in the civic registry; rather they can be considered valuable knowledge-units in a global effort to increase the flow of expertise across borders

In the E.U.-sponsored “*Learning for active citizenship*,” Edith Cressen claims that membership in the European Union “commits us to developing citizenship of the Union, not just in a legal sense but also through the fulfillment of the ideal of a Europe close to its citizens. This means seeking to encourage people’s practical involvement in the democratic process at all levels”. (Cressen, 2002) ⁶

Thus, long-term information systems in Europe should be addressing the ability to promote a larger sense of democracy and participation. So rather than producing media for these cities just to entertain or navigate, we ask how we can use the media as an expression of this cultural moment? What type of media would latch on to this location-awareness and bring cultures and people together that might not otherwise be able to connect?

To begin to answer these questions we are focusing on the process of *technology innovation* starting from people rather than from the laboratory. Instead of developing new ideas or products in the “perfect and controlled world of the lab,” we start from the street-level (which means, in our case, the water-channel level), from what people (locals and tourists) actually feel and need in their everyday life.

From there, we want to move to the “lab level” of design of mobile artifacts for both consumers and citizens in a digital age.⁷

The *street-level approach* of this design project implies that we, as researchers on technological change, are aware of contexts and social practices. That is to say, the background where new technologies are to be implemented and used. In other words, any technology has to fit the context and needs of users to be successful and meaningful. As Ilka Tuomi puts it, “If new technology is not used by anyone, it may be a

⁶ For detailed information, go to http://europa.eu.int/comm/education/archive/citizen/citiz_en.html

⁷ Bruno Latour claims that because of the interpenetration of technology and society, we actually live in a “worldwide lab”, i.e., research in technology is already embedded in social practices. For more, see Latour, B. (1987) *Science in Action*. Cambridge: Harvard University Press and Latour, B. “The World Wide Lab” in WIRED Magazine 11.06, June 2003.

promising idea but, strictly speaking, it is not technology. Similarly, if new knowledge has no impact on anyone's way of doing things, it is not knowledge" (Tuomi, 2002).

Therefore, our project and process have been to lay the land for the construction of a meaningful mobile technology for both locals and tourists in Venice. A meaningful *technology-in-use* would be an artifact that is rooted in social practice. By social practices we refer to complex networks of tools, breakdowns, concepts and expectations of the different actors involved in Venetian tourist and civic activities.

As the figure N°1 shows, there is a bidirectional relationship, a *feedback loop* from technology design (prototyping and testing) back again to the social conditions of the Venetian communities of production (locals) and pleasure (tourists).

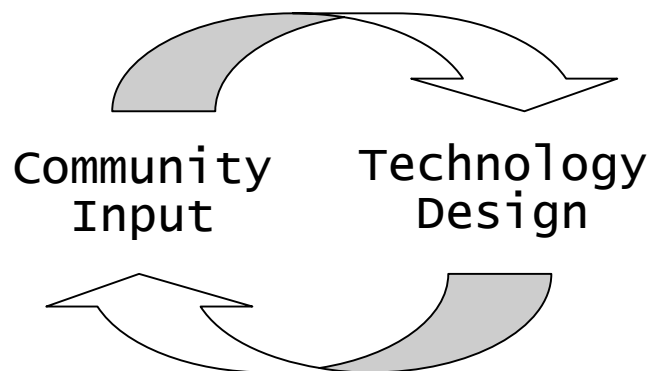


Figure 3 Community-based design loop.

Such media would then have three financial resources:

- **Public Resources:** The knowledge exchange might qualify such efforts for funding from public entities such as the European Union, State Communication Funds, and Public Access Funds. It would also be attractive to local governments looking to improve their high-tech infrastructure and educate their populace. Such governments might provide key assistance in installing network nodes, maintaining them, and providing training to users and technicians.
- **Local Businesses:** Venture capital and private organizations such as *Veneto Innovazione* and the *Guggenheim Foundation* involved with tourism would be

willing to support the project as it has the potential to attract more visitors and to shape these activities, they are. Beyond advertising, these entities might willingly provide database information (hotels, restaurants, etc.), house Wi-Fi transmitters, and help tourists use the network.

- **Local Custodians:** Local citizens are a key component we see for content development and promoting use of this service. If they believe and participate in the project from its inception, i.e., acting as a community-of-designers, they might create the buzz to really attract community of users. This design intention is what we term as a community-centered design approach.

2. MEANINGFUL CONTENT FOR MEANINGFUL INTERACTIONS

As with any media, content is king. No matter how appealing the devices or how cool the applications, if the content is not meaningful to people who inhabit and visit these tourist cities, the systems will not be used. What's most striking about mobile devices is how linked to one's surroundings they can be and the potential for interpersonal and civic contact they offer. Thus we feel that any successful use of this medium will involve the collaboration of people who inhabit tourist cities and a sensitivity to the places where they will be implemented. Thus our approach to building *meaningful content* for these devices, is called community-centered design.

2.1. Community-Centered Design

We are coming from a perspective of what we call "community-centered design." This process is similar to what is known within workplace design as "The co-design approach." The co-design approach has been identified as part of "process architecture" by progressive architects Porter, Horgen, Joroff and Schön in their book *Excellence by Design: Transforming the Workplace and Work Practice* (1999). As modeled below, one key aspect to this approach is establishing a cycle of design inquiry that continues to question solutions. This process involves a cycle of ongoing inquiry involving stakeholders (citizens), consultants (us and technology companies), and management (government and infrastructure organizations.)

Image Source: Excellence by Design⁸

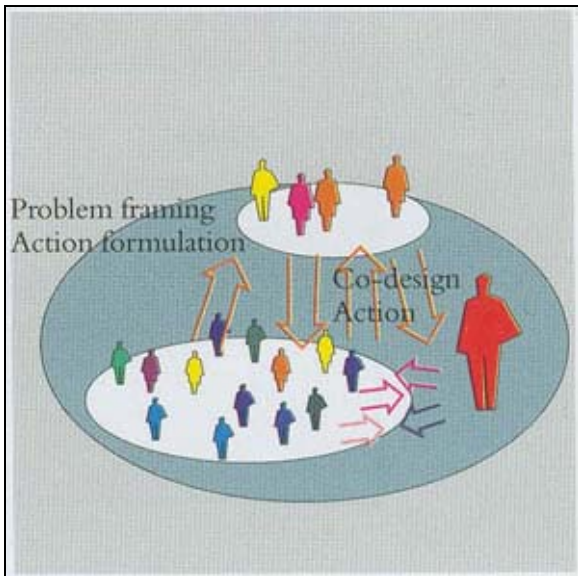


Figure 4 The Co-design approach

Co-Design or Community-Centered

Approach: This model brings the community into all phases of the design process. The expertise of design is spread throughout the role of the community, the consultant, and the management. In Venice's case this would become an ongoing series of focus groups, user testing, and collaborative design workshops. Many of the suggestions that arose from the local focus groups was gathered in this manner. What this process creates is not only a more appropriate product for Venice, but job skills training for a community of experts to help and advance its implementation.

2.2. Methods

For two months (June and July 2003) we conducted fieldwork in Venice to find out what is going on with current practices of tourists and locals. We observed, talked and interviewed citizens, tourist guides, hotelkeepers, information kiosk workers and, of course, a good deal of tourists.

We used quantitative and qualitative methods. As for the quantitative methods, we took a survey of 100 tourists randomly around the city using a close-ended questionnaire of 16 multiple-choice questions. The graphs and charts in this report correspond to an analysis of this data. We enriched the survey with approximately 10 in-depth interviews to some of the same tourists who responded to our questionnaire. We conducted 4 focus groups with locals, hotelkeepers, tourist guides and information kiosk

⁸ Porter, Horgen, Joroff and Schon, Excellence by Design: Transforming the Workplace and Work Practice (New York: John Wiley and Sons, 1999), 48.

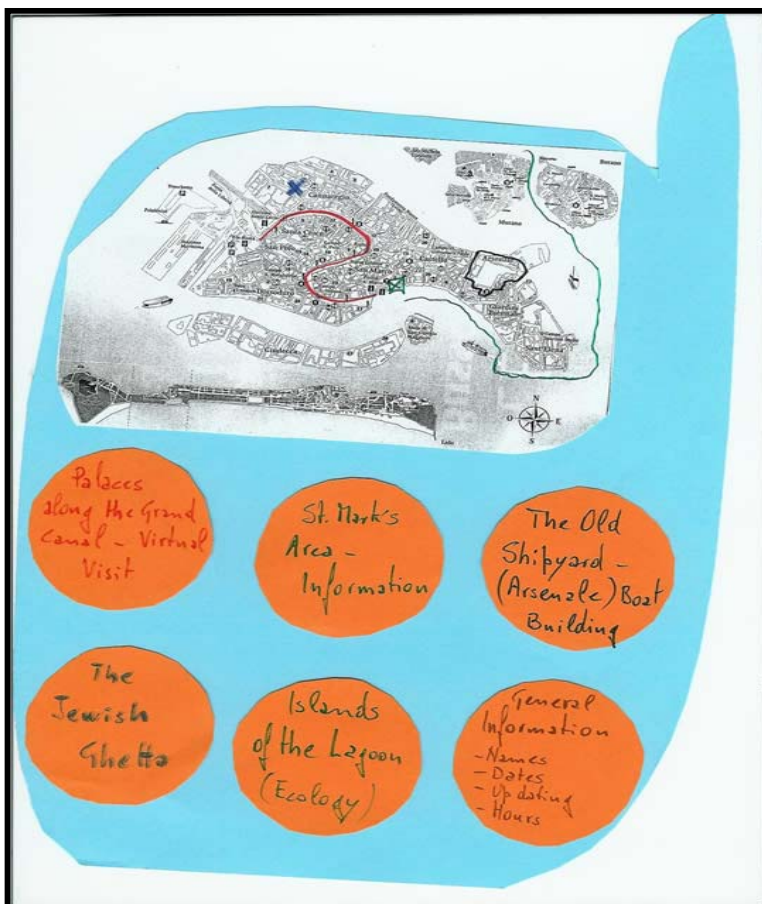
workers. Finally, we did a few interaction analysis and ethnographies of *technology-in-use* and tourists' *spaces*, which we also video recorded.

Ethnography, the traditional method of social and cultural anthropology, involves the careful study of activities and relations between them in a complex social setting. Such studies require extended participant observation of the internal life of a setting, in order to understand what participants themselves take to be relevant and meaningful aspects of their activities and communities. This may include things that are so familiar to them as to be unremarkable, although being evident in what they can actually be seen to do. (Suchman and Trigg, 1991)

2.3. Working with Local Focus Groups

Our approach to the local side of the co-design process was to hold a series of focus groups with various types of Venetian citizens who could provide insight into both the needs of tourists and local key issues.

Such approach was initiated in our conversations and creative exercises with local tour



guides, hotel owners, information booth workers, and concerned citizens. Many of the more creative suggestions for mobile technology use arose from co-design activities in which participants were given paper models of mobile technology and asked to build functions for these devices that they felt would be good for tourists and beneficial for the tourist and local communities.

Figure 5 Paper model of future mobile device for tourists in Venice, constructed by a master tourist guide, Guido Leon, *History Unwired* 2003.

Our discussions and exercises with these people had two threads: practical and cultural concerns. We also gave interviewees a brief description of the most promising mobile technologies to start the first in a series of dialogues between community and design groups.

3 LOCAL CONCERNS AND (POSSIBLE) SOLUTIONS

This dialogue led to the following recommendations for mobile content. We describe them in terms of practical and cultural issues. The innovation boxes below offer potential solutions to local suggestions for content, services and applications.

3.1 TRANSPORTATION

- Tourist guides noted that it can be difficult for visitors to figure out transportation **schedules** and rules for **payment** and conduct. For instance, finding and paying for Vaporetto and Bus tickets can be especially difficult for tourists (and sometimes locals).

INNOVATION BOX: Transportation

Mobile Devices could provide easy access to schedules of various transportations sources and even permit purchasing tickets if connected to a wireless network. For locals, networked mobile devices might make transportation times, especially on boats, as locals could work, learn, or read while on the Vaporetto.

3.2 ACCESS TO CURRENT EVENTS

- **Language:** Listings in newspapers or on *locandinas* (billboards) are all in Italian.
- **Accurate Information:** Tourists want to know more precisely what is going on when and where around the city, especially for evening activities.
- **Filtering:** Given the myriad of events, tourists don't know where to start.
- **Content:** The *European Federation of Tourist Guide Associations* is interested in providing information for these devices.

INNOVATION BOX: The Here and Now of Venice

Mobile Devices, as with a website, can hold dynamic content that easily updatable. Filtering is now common with such technologies, as with membership applications online, you fill out a form stating your interests. Possibly the most intriguing application would be for location-aware mobiles in which you could find out "What's going on right near me?" Or even better, "Are there any gallery openings happening in the next two hours near me?" The device might also help to divide tourists into those with general interests, and those with niche interests (art, music, etc.) to better guide them towards the events they would like.

3.3 MAPPING

- Lack of details expressed in no street names, for example.
- **Itineraries:** Tourists want a range of Itineraries. The problem is that “some small parts of the city like Castello, Giudeca and Lido are reserved for Venetian people.” (Personal Interview, 2003). The challenge of creating alternative routes is to find a balance among dispersion, freedom of exploration, time constraints and preservation of local life.
- **Getting Lost:** Tourists both enjoy and get frustrated with being lost, depending on the situation. In general it was pointed out that trying to see Venice in 5 hours can lead to great frustration.

INNOVATION BOX: Positioning in the City

For location-aware mobile devices, an obvious solution is developing a map that shows where you are and like many navigation systems, can give you precise directions to where you need to go. However, in practice this content might produce detours which distract viewers from the beauty of the path, or causes traffic jams from distracted pedestrians, or even deny the pleasure of getting lost in Venice. The design section of this document will discuss these issues further, but possible functions of “quick turn off,” general rather than precise location toggle, or possible suppression of streets to give a map of just land and water could address these issues.

3.4 COMMUNICATION

- **Language:** As with all foreign travel, language limits can become a problem (and also part of the fun).
- **Internet:** Few access points. The possibility of reconfiguring the information kiosks to include an Internet station.
 - Further idea of being able to see other museums or even cities with displays or histories connected to the current histories you are experiencing...especially in cities you might be visiting later.
 - Gaming abilities based on the place you visit, as in the video game “Age of Empires.”
- **Phones:** Cards hard to use. Few coin phones.

INNOVATION BOX: Ultimate Roaming

If phone and Internet services are included in the devices, they would have a wide appeal to many types of travelers, according to our previous data. Game ideas are also very compelling, especially for family travelers. The interconnections among various museums are promising for a rich educational experience on a tour of Italy.

3.5 CONSOLIDATION:

- Tourists would like to consolidate the many maps and books they carry into one device.
- The ability to find an event, locate it on the map, and make reservations/buy tickets all in one device.

INNOVATION BOX: One Device

Mobile Devices can hold a lot of print information. One of the major challenges is to get a readable map onto a small display screen. Future work with electronic paper may make possible a paper map that serves as display screen for an electronic device, providing digital information in a familiar format. It might also be complemented with a few large-screen, digital community poster boards called Plasma Posters.

3.6 CAPTURING VENICE

- According to some interviewees, there is a problem of not having a device such as a camera or recording device to capture and archive the Venetian journey.
- Photo, video, and even dictation are possible with new devices.
- Devices connected to the Internet could create a memory repository (text, audio, video, photos, etc.) on the fly as you experience things. This is already somewhat underway on the Venice Tourism [website...](#)

from 03/07/2003 to 10/08/2003
Theatrical Review "Terraferma Estet in Riviera" - Riviera del Brenta (Theatre & Dance)
WHERE IT HAPPENS
Ville e luoghi storici della Riviera del Brenta
- MIRA (VE)
for information 0414286545
DATES
from 9.00pm
DESCRIPTION
12 plays of open air Theatre Review, in gardens and beautiful places, organized by the Circuito teatrale regionale Artven, Provincia di Venezia, Regione del Veneto e Comuni di

print
add to travelbook
locate in map
at the same time...

Figure 6 Creating an online scrapbook with www.turismovenzia.com tools.

INNOVATION BOX: Digital Scrapbooks

Recording (audio, video, and photo) devices for mobiles are becoming more practical and integrated. Creating a web repository, scrapbook, or blog for preserving and sharing the moments of a vacation are in development. (See the m-to-Guide project in the Design Section.)

3.7 MUSEUM OR DEAD CITY?

- **Local Services:** Services like butchers, household needs, etc. are disappearing.
- **Prices/Rent** too high to support a local population
- **Little night life**

INNOVATION BOX: Local Preservation

Mobile devices could, first of all, be designed in conjunction with a campaign to preserve local life, providing marked maps and contact information for local entities participating in the program. Devices could track movement and purchases to local areas and possibly give coupons or other rewards to tourists who show interest in preserving local culture. The device could also help initiate ongoing relationships between visitors and locals (i.e., e-mail, instant contacts, or shared photos.)

ENVIRONMENTAL ISSUES

- **Floods:** Tourists are sure when the city will be flooding our how to use the system of *passarellas* (raised sidewalks).
- **Overcrowding:** Certain tourist zones are packed, while other historically and commercially appealing areas are less-visited.
- **Trash:** Boat hauling of trash is time-consuming and expensive.



Figure 7 Dilbert on Pedestrian Traffic
(from www.dilbert.com)

INNOVATION BOX: The Environment

As mentioned above, a new set of alternative tours could be incorporated into the building of a mobile tourist platform. These tours might alleviate some of the overcrowding issues. Maps could also be built for the device indicating trash cans and *passarellas* routes during high water. In general, the device could contain an always available help file on how to tour Venice in an environmentally conscious way.

3.8 CONTENT BRAINSTORMING

What follows are some of the most impressive tour concepts to come out of our focus groups with various local entities. These are concrete entry points into some suggestions raised by members of the community of designers.

Practical Concerns	
Venice Sport	The ability to find water sports and other sporting activities and events throughout Venice.
Useful Numbers and Locations	(Police, Hospital, Drug Stores, etc.)
Enjoying Venice with Your Children	Museums, restaurants, etc. that offer discounts, age-appropriate information, or kid zones. One possibly transforming capability of mobile devices is the ability to see where users are in the "grid" of a location-aware system. Thus children might be able to "wander" more without losing contact with their parents. In addition, the gaming and general gadget interests of children might mesh well with mobile electronic tourist guides.
Things you can do for less than 5 Euros	Museums, restaurants, bars, free tours, local events, etc.
Handicapped Access Routes	With its many bridges and stairs, Venice can be quite challenging for the handicapped. This tour would include routes with wheelchair lifts or ramps. See http://www.comune.venezia.it/handicap/
Nature/Science	
Islands of the Lagoon	Both their ecology and their historical significance
Crossroads and Limits	Canals and Streets - why do they cross where they do? How does Venice change at borders with water and where it meets the mainland (Tronchetto) or Nature (Palestrina)?

Venice and the Water (both historical and natural sciences)	Venice arose from marshland and is still unique in its combination of water and land. Learn both the history and the ecology of how water and land coexist in Venice.
Construction of the Gondola	Go to the workshops and the testing grounds of Gondola makers. Get a highlighted map of all the gondolier launch points and antique gondolas on display (i.e., Ca' Rezzonico).
Building the City of Venice	From a marshland to a city of canals. Supported by video, maybe games, and interactive models
Modern Venice	
The palaces along the Grand Canal which are still Inhabited	Learn the family history, the uses, and the unique characteristics of the palaces that still serve as homes. Video interviews, floor plans, and even real estate price lists could complement the information.
A day with Venetians	A tour of Venetian schools, transportation hubs, and jobs. See testimonials of what it's really like to be Venetian—the good, the bad—and what the various rhythms and highlights are for locals.
Film Locations	Which films were made on this spot? See clips where they were filmed (i.e., <i>Indiana Jones</i> , <i>The Talented Mr. Ripley</i> , and <i>Death in Venice</i> .)
History/Culture	
Secret Itineraries of Famous People	Track the Marco Polo's formative locations. Discover the haunts of Casanova. Follow famous Venetian artists from birth to death through the <i>calles</i> of Venice.
Arsenale	The old shipyard...its history and current use. See http://www.seevenice.it/iter07e.html

Virtual Palaces	The ability to navigate oneself through the palaces; also to see things that are buried in the bottom of the Grand Canal.
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4 TOURIST DATA

4.1 Everyday Practices In Venice: Actual And Possible Users

As we stated earlier, Venice is one of the most visited cities, not only in Italy, but in Europe: 14 million visitors per year, 140,000 visitors on a routine summer day in a city of only 70,000 “local citizens.” As we also noted earlier, this is the real challenge that Venice faces in its everyday life: “Too much [sic] people” (Cacciari). However, relevant questions here are, Who are these people? What are their activities? Where do they stay? How do they gather information? How do they book lodging, make restaurant reservations (if any), and find their way to museums, churches, and cultural venues? What are their main information sources? Are they comfortable with what they’ve got? How do they communicate with locals? What is the role of Venetian citizens in these complex networks?

The construction of typologies of users in social studies of technology has been a common topic and methodological strategy for dealing with the different patterns of *technology-in-use* (Catalan et al., 1999; Garcia et al., 2002; Kopomaa, 2000; Feedback, 2001). Outside the realm of information and communication technologies, we also find typologies of consumers of different products and services (Mendez, 2000) and even types of people, e.g., citizens regarding their relationship with a national identity (PNUD, 2002).

In tourism-related studies we also find typologies of users/consumers. In fact, Costa and Manente (1996) developed through a sophisticated statistical analysis a typology of Venetian *excursionists*, i.e., visitors who spend less than a day in Venice. According to them, there are four types of excursionists in Venice, namely, true, indirect, in-transit, and false (Costa & Manente, 1996) ⁹.

⁹ The description of these categories is as follows: “**true excursionist**, describing those who visit the historic center during the day, leaving from and returning to their place of residence; **indirect excursionist**, describing those who visit Venice leaving from, and returning to, the same vacation site; **in-transit excursionist**, whereby those visiting Venice leave from a (residence or vacation) site different from the (residence or vacation) site towards which they are directed; **false excursionist**, for which visitors with Venice as their principal travel destination are lodging on the mainland, either due to insufficient accommodation supply in the historic center or, more likely, to save money” (Costa & Manente, 1996: 22).

Though these categories may be useful for quantitative analysis of flows of in-transit excursionists in Venice, they are not suitable for our design thinking about meaningful mobile technologies for locals and tourists. Consequently, by using qualitative methods, we tried to disclose new niches for understanding tourists with regard to the use of information devices and Venetian life, joyful experiences, travel needs and problems, technology use and related skills, general evaluation of Venice, and new ideas for improving their tourism activities.

Our types of tourists are in relationship with not only suitable and meaningful mobile technologies but also with the very meaning of the *travel experience*. As for exploring such meaning in relation to our own analysis of nationality, length of stay, type of group, and information devices, and technology users, we draw on the categories developed by *Context-based Research Group* and *Carton Donofrio Partners Inc.* in their *Travel Study* (2002).

This study claims that all travel is powered by three variables-three needs that travelers seek to fulfill: "The most basic is that of control over their travel experience. People also demand a consistent level of service throughout the whole process. And ultimately, people want an experience that brings them the joy of travel. Control. Service. Joy. These needs must be satisfied throughout the planning, mode and destination stages." (Context, 2002) According to this relevant study, consumers see travel as a process: "They *plan* their trip, travel via some *mode* (air, train, ship, car), stay at their *destination* for a time, then pass back through the *mode* to get home" (idem).

Now we want to move to present our data, taking into account the above description and dimensions concerning the meaning and experience of travel. Of course, we are focusing on a particular type of traveler: the Venetian traveler. However, as we will describe below, there are some Venetian travelers who visit only Venice, whereas others travel to Venice as part of their Italian/European trip. This may imply a different approach to information devices as well as demand for mobile technologies. (See business scenarios.)

Our survey data, as we just said, are intended to disclose relevant categories of *tourists* and *everyday technology users*. Though ours is not a *representative sample size*, due to the fact that we interviewed around 100 people (18-75 years) randomly around Venice and (as we described above), complemented this survey with qualitative techniques, it does open up categories of analysis and foster our design process.

4.2 General Patterns: a first step into Tourist data

We will present a categorization of types of users and their specific demands/concerns/needs about Venice experience, information, and communication devices. This categorization would help, we believe, to inform the mobile technology design (software) and the business plans (strategy).

According to the History Unwired survey and data recollected by others (Costa & Manente, 1996), though the amount of tourists is huge, their length of stay, on average, is short. As Costa and Manente show, there is an important number (12% in History Unwired data) of visitors --the so-called "excursionists"-- who visit Venice one day or less, sometimes just a few hours. According to our data, among the tourists who spend more than one day in the city, almost 75% of them spend between 2 and 5 days in Venice, as **Chart 1** shows. This fact is related to the tourist-based problems facing Venice because, in a short visit, the level of *commitment* with the city and the amount of spending is not high.

This is also a limit for thinking about and designing a mobile technology that would fit this "time" constraint in terms of its learning, user-friendly applications, practicality, and affordability. An alternative for overcoming this "time constraint" would be to link content and mobile technologies for other world-class tourist cities whether in Italy or other countries in Europe (Stockholm, for example).

Chart 1 Length of Stay in Venice (Days)

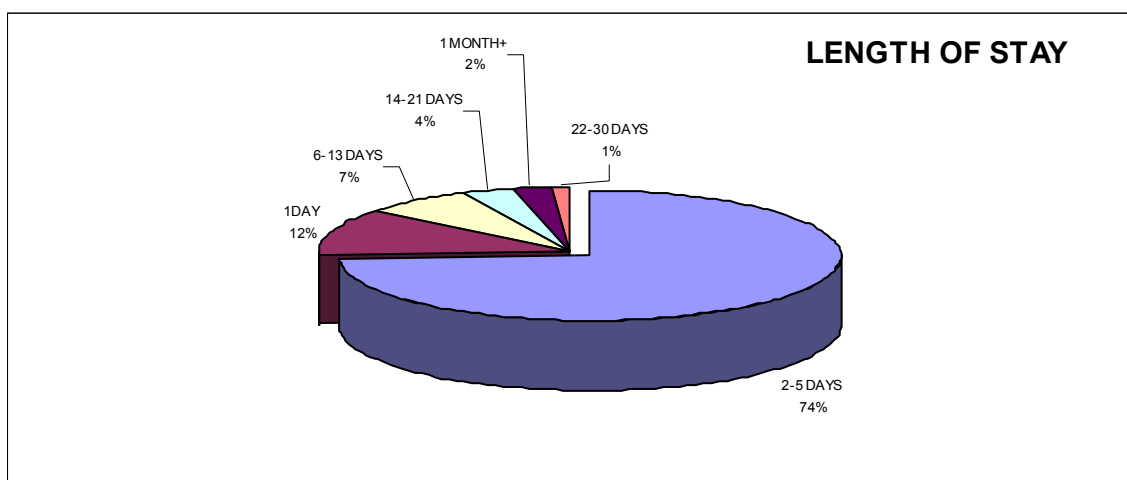


Figure 8 Length of Stay Chart, Source: History Unwired, 2003.

As for visitors' ages, our data suggests (Chart 2) that more than 75% of the tourists are between 21 and 40 years old. This statistic is important for mobile technology design since these generations are permeated by new communication technologies and, therefore, skilled enough to use them.

Chart 2 Ages of the Tourists (%)

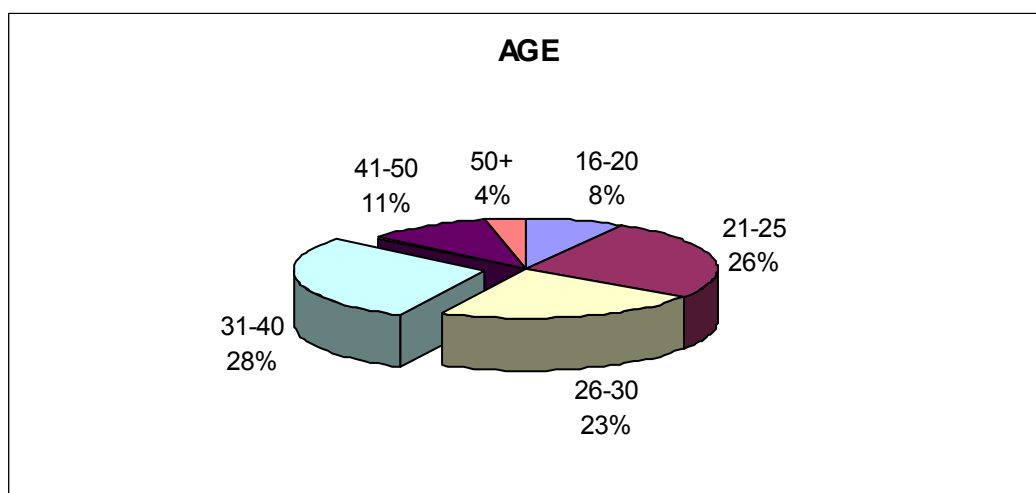


Figure 9 Age of Tourists Chart, Source: History Unwired, 2003.

The "fluid population" of Venice is highly international. In a routine summer day, almost 70% of the population actually present in Venice is composed of tourists (who spend more than one night in the city) and excursionists (who visit and leave the city in

the same day). The other 30% are locals. According to ours and other data (Costa & Manente, 1996; Tourism Intelligence International Research, 2001/2002) the German, American, English and Canadian are the main sources of this international flow.

4.3 Community Input And Tech Design: From Problems To Innovation

A key issue of this fieldwork was to identify about possible problems, needs and anomalies in current tourist practices. The exploration of *anomalies* in practices is a method by which certain innovators and entrepreneurs try to look for new opportunities of change and transformation in the networks of tools, concepts and expectations (Flores, Dreyfus & Spinoso, 2000; Tuomi, 2002). In our case, this exploration was intended to figure out the problems and needs visitors face as they try to control their travel, get good service and information and, of course, have a pleasant and enjoyable experience.

As for Venetian tourists' problems and anomalies, Chart 3 shows that Venice's status as a world class-city reflected in high prices of everyday needs (food, vaporetto, restaurant, hotels, gondolas, souvenirs). Then, two factors --"orientation" and "moving"-- related to our description of needs, types of users (tourists) and suitable technologies.

"Venice is really a complicated place: you get lost, you even are unable to find your hotel and nobody helps you" Canadian Female (21-25)

These are some problems that tourists face. The issues of "getting information" (9%), "access electronic information" (8%) and "limited time" (9%) seem to be lower in tourists' range of needs. However, when following some qualitative discourses suggest that certain tourists complain about Venetian services related to information. The following quotes reveals this situation:

"The public transportation information here is a mess. Also booking restaurants is difficult. The people are unfriendly if you don't speak Italian, so please send them to friendly schools. We are carrying two guides: Everyman Guide (too much information) and The Rough Guide (only the top 20 places). Software for a mobile device? Mmm, maybe, maybe not" English Couple, (26-30) paraphrased

Chart 3

Tourism Anomalies in Venice

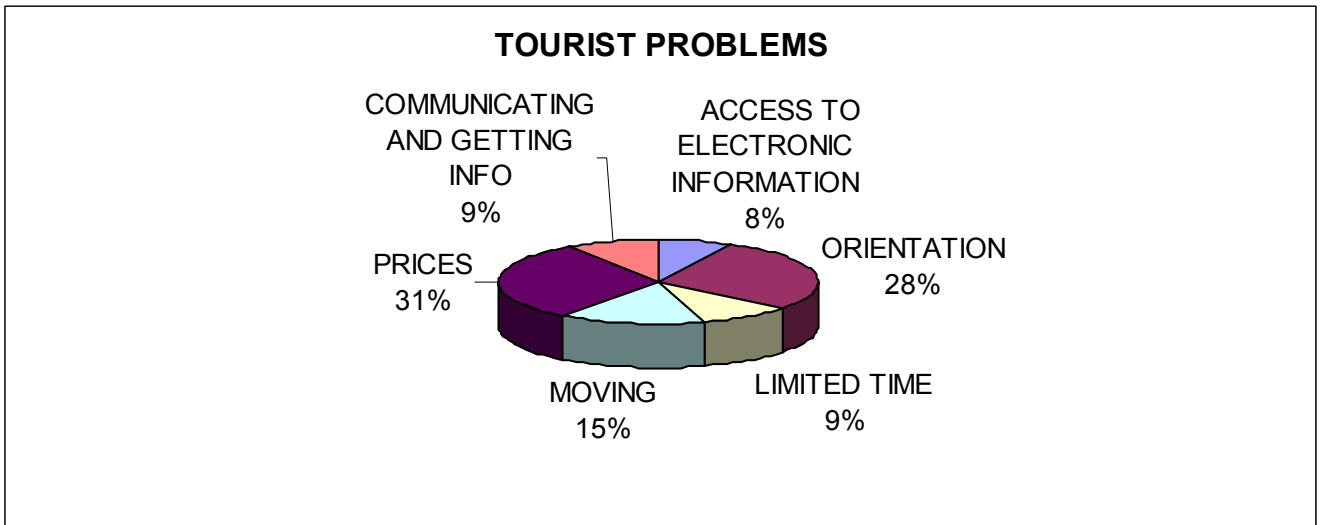


Figure 10 Tourist Problems Chart, Source: History Unwired, 2003

“We would like more historical information and less about paintings. We would like to fast forward the device and skip some rooms. It would be great to have a device using something like GPS to track the history of the streets.” American Family, commenting the Palazzo Ducale’s audioguide (working in a Pocket PC)

4.4 Information Devices: Atoms (Paper) and Bits (Digital Device) Reconsidered

According to Chart 4, both digital and paper-based tools are used for information-seeking and planning activities.

Chart 4 Information Devices of Venetian Tourists

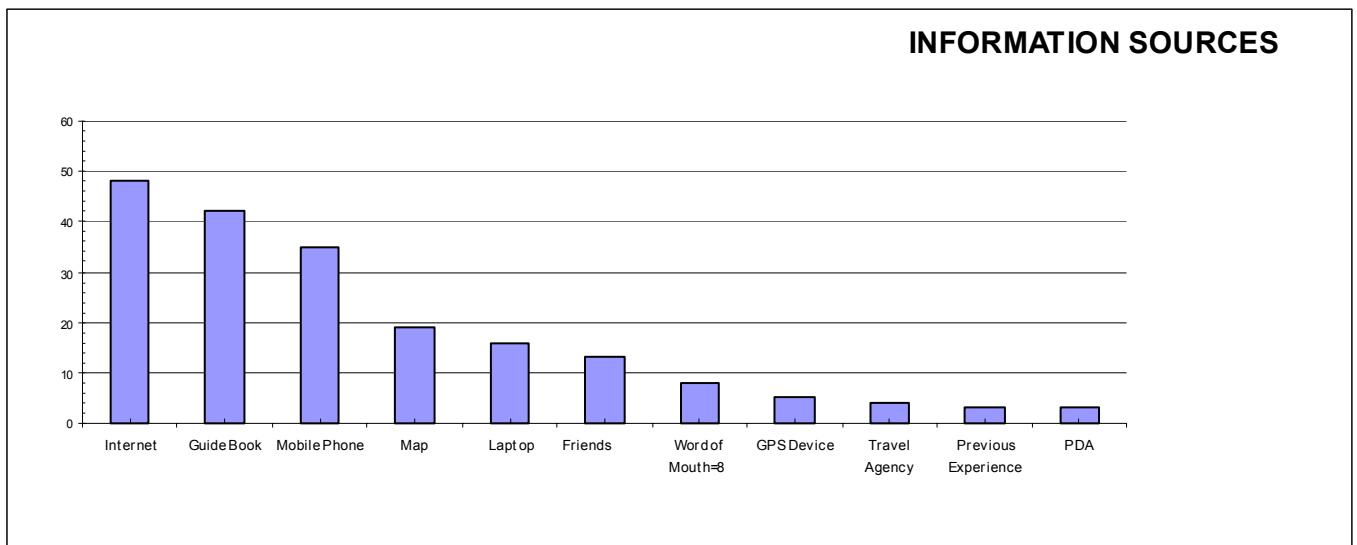


Figure 11 Types of Devices Chart, Source: History Unwired, 2003

Most of our interviewees claimed to use the Net for gathering information about Venice and, in many cases, for booking hotel reservations --the principle lodging type-- in advance. The use of information technologies --especially the Net-- before the visit turned out to be a common experience for most travelers.

Paper-based media are still the main source of information for “controlling” the travel experience. Specifically, *paper-based maps* are an important source for tourists to locate themselves in the Venetian labyrinths.

“I also enjoy reading maps.” English Female (26-30)

“We brought 2 guides books but we haven’t used them yet. But we love maps” English Male 41-50

As researchers of communities and technologies, we are aware of the value of paper-based media such as guides and maps. *We don’t want to pursue a tunnel-like*

focus on information, self-evident and free of context nor to remain too loyal to the digital presumption of a binary world. As social scientists bringing community input to the technology design, we try to avoid the temptation of new techniques and technologies that fail to improve on the media they replace. As innovation researchers Brown and Duguid point out, new technologies “often aim to remove a surface constraint (objects, organizations, practices, institutions) without appreciating their submerged resourcefulness. When this happens, the old resourcefulness often wins, to the frustration of technologies and futurologists” (Brown & Duguid, 2000)

For example, Venetian tourists usually walk with maps in-hand. Even though they recognize some limits to the “resourcefulness” of this media, especially when they are outside the ‘mainstream’ route connecting St Marks Square with the Rialto Bridge, they might still prefer using this resourceful type of media, even when given the option of using an electronic map.

However, digital technologies, especially cell phones and laptops are also used by most tourists. Some mobile phone users—European “always on” users and most Italian visitors or locals using a GSM standard—take their phones to Venice, whereas other tourists preferred to be disconnected from their home and work responsibilities while traveling.

The guides like *Lonely Planet* and *Burlitz* are good for train info, not for dining. Also some of these guides are not updated. GPS would be nice for looking for restaurants. A PDA would be great for writing and recording all that we like here. (Paraphrased) Canadian Family

We brought 2 guidebooks but we haven’t used them yet. But we love maps. Maybe a map in a cell-phone is a good idea. (Paraphrased) English Male 41-50

4.5 Qualitative Types of tourists: mapping practices, needs and demands

A practical and meaningful categorization of visitors to Venice answers the following questions: who are they? How do we unpack the masses that over-crow the historic city? Here is a way. Following is Chart 5 with a categorization that want to open up the tourists' black box.

Chart 5 Unveiling Tourist Patterns

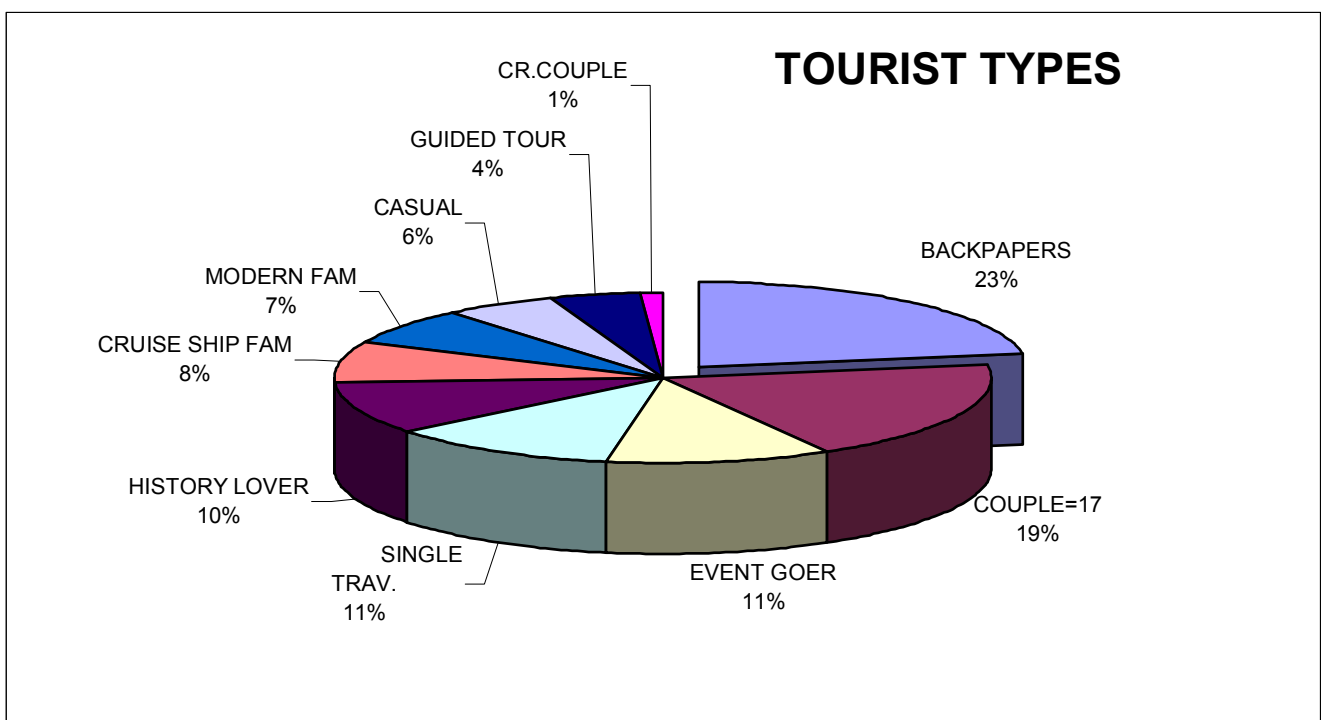


Figure 12 Tourist Types Chart, Source: History Unwired, 2003

At a first glance, Chart 5 shows us that there is not a predominant category of tourist: there are several ways of arranging “control, service and joy” in Venice. That is to say, there are different ways to visit, acquire information and enjoy Venice. There are multiple information devices that can be used for improving the urban exploration and joy. There are several ways of being either *intelligent* or *dumb* while visiting Venice.

Before going into more specifics, a brief issue concerning tourist typology deserves attention. When we talk about types of consumers of Venetian experience,

i.e., types of tourists, we are not talking about ideal types (Weber,1912), but rather about symbolic practices (users) characterized by different needs, tools and expectations that can be aggregated in groups that can shed light on the way communities and users appropriate Venice actually and potentially. In other words, we are using an analytic tool to open up the “black-box” of tourist and local Venetian practices and, then, inform technology design. Table 2 categorizes the understanding of salient experiences and prospective uses of technologies.

Table 2: Qualitative Categorization of Survey Results

<u>Type</u>	<u>Experience</u>	<u>Prospectives of Devices Use</u>
COUPLES (2)	Want to walk, Sightseeing away from crowds. Carry guidebooks. Use cell-phone Might be interested in mobile applications	Use technology, depending on context. Create electronic scrapbook Find nice and quiet restaurants. Make reservations and receive updated information.
CRUISE SHIP FAMILY	Visit main museums Attend many different needs at one time Have problems of movement. Concerned about time constraints Desire security Average 2-day stay	Moves efficiently Coordinate family and routes. Coordination and walkie-talkie functions. Experiencing Venice prior, during and after the trip.
EVENT GOERS	Have professional interests in trip Have a fairly aggressive agenda Trying to get on the “in” crowd Connect with people and events Come for 1-3 days	Might like to build an electronic scrapbook. Want cell phone that is a local number. Internet access. Video and photo functions. Create database of people with similar interests and background.
BACKPACKERS	Travel cheap Like Camping. Seek adventure. Stay on the mainland. Visit main attractions.	Refer to <i>Lonely Planet</i> Need something new for when they get to the site. Provide low cost of access or free content at sites. Camp sites are hard to find.
HISTORY LOVER	Typically refer to books. Looking for more information and context. Expect highly enjoyable experience of joy. Acquire information	Contain location-aware systems to appeal to their information demands (history of the streets, contacts w/locals) If young, possible target for mobile tech.

	before and after.	
MODERN FAMILY	Arrive and start walking around to check stuff out. Leave a ton of devices at home.	Provides safety and coordination tools Facilitates last-minute arrangements Offers uploaders access Can record memories. Provides safety and coordination tools. Offers contextual information.
GUIDED TOUR	Use of whispering technology in Rome, might lead to wider adaptation. Alter between guided exp. And free exp.	Provide technical information (how this was built, agriculture, religious ceremonies, dam works.) How people LIVE, info about the everyday life, customs.
SINGLE TRAVELLER	Tend to be older and single or young Eurorail Are hungry for discovery and independence Worry about being taken advantage of Tend to depend on guide books or word of mouth. Creates freedom of movement.	Provides safety Connects travelers to "buddies" also traveling. Provides Internet access. Connects with local culture, schools and civic activities.

Figure 13 Table of Tourist Types, Source: History Unwired, 2003

Table 3 summarizes the preceding tourist experience by presenting it in terms of *technological use*, *information demand* and the so-called *ratio* between *face-to-face interactions* in a broader sense (say the experience of the "place" or the contact with locals and their cultural practices), paper-based media (such as guide-books and maps) and digital devices and information.

Through this table we quantified the extent to which these tourists types are willing (or ready) to use new mobile information technologies in their Venice exploration. We constructed four variables—*technology use*, *nature of the trip* (H=Holidays;B=Business) *information demand* and *consumption equation* between face-to-face (sense of a place or the situated body), paper-based media and digital tools.

Table 3: Technological Disposition, Information Demand and Delivery Conduits

	Technology Use	Nature of Trip	Information Demand	Ratio b/w face2face/paper/digital
Couples	3	H	4	2:3:5
Cruise Family	4	H	3	1:5:4
Event Goers	5	B	5	4:1:5
Backpackers	2	H	3	2:3:5
History Lover	2	H	5	4:4:2
Modern Family	4	H	4	4:4:2
Guided Tour	1	H	2	5:3:2
Single Traveler	5	B/H	4	3:3:4
Repeat Visitor	4	H	3	2:2:6

Figure 14 Information Demand Table, Source: History Unwired, 2003

The *technology use* is a scale between 1(low technology use) and 5 (high use) as well as in *information demand* where 1 represents low demand for information and 5 high demand. As for the sources and conduits that deliver actual and potential information, we look at the way these types of tourists consume and mix different sources of information. The fourth column of the Table 3 gives an approximate *ratio* for the relation between these face-to-face practices, paper-based media and digital devices.

For instance, 2:3:5 for the couple case means two face-to-face interaction (or the sense of a physical place) to three paper-based media uses to five digital device uses out of the total consumer experience. There is a non-statistical approximation to the way they arrange in their practices and suggest a complementation between face-to-face, paper and digital interfaces. These three numbers for each type make a *ratio* which total is always 10.

The “nature of the trip” is a simpler variable where H stands for Holidays and B for Business or work. The nature of the trip is relevant for understanding and contextualizing the other three core variables. We analyzed and processed in Excel the data from our survey.

Almost all of the types of tourists demand some sort information and thus are willing to receive it for different purposes. A good deal of the travel experience has to do with the *transformation* of information into service (finding a cool and cheap restaurant), joy (a couple that find a nice spot out of the crowd for a romantic moment

or a dinner) and, of course, into control (orientation, vaporetto schedule, finding your way to the hotel, updates, key shops, etc.).

5 CREATING A PRODUCT: MARKETS AND DISTRIBUTIONS

5.1 Two Types of Content: Low-End and High-End

Comparison of local and tourist design ideas produced two categories of final content and distribution methods: high-end and low-end services. Graphic #6 presents the major tourist types in circles. The shaded portions of these circles represent the segments of these tourist types who reported a likelihood of using mobile devices or the Internet while in Venice.

These shaded regions show a consensus of needs that could drive specific content choices. These content choices are divided into high-end and low-end services. Possibly most important in the graphic is to note where the Venetians fit into the picture: they are both content producers and custodians of the devices. That is, locals might use some or all of the services (event-finder, transportation tracking, ticket purchasing, games), but most importantly they have a sense of ownership over the devices and act as guides to those trying to use them. We see this development process as generating both a free information service to locals and a training ground for creating the tech-savvy work force the Municipal Plan calls for.

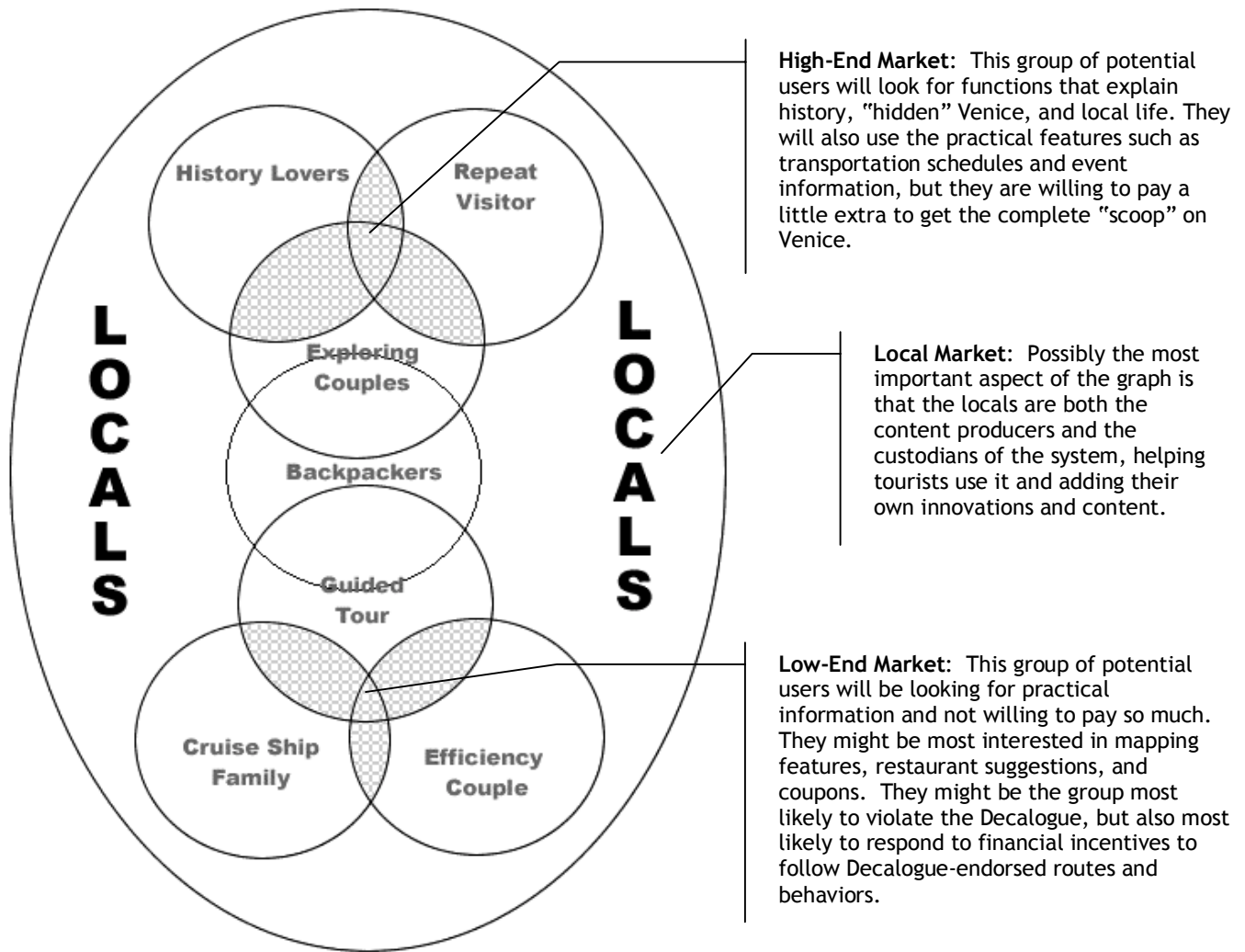


Figure 15 Chart 6 High-End and Low-End Products Produced by Local Custodians

5.2 Major Obstacles

Screen Space

One of the most challenging design issues confronting mobile technologies is that of display screen. Users don't have the "real estate" to properly display a map, a page of text, or a descriptive photograph. Prominent technology companies such as Sun Microsystems have set forth the design constraints of mobile devices: "Screens should be simple in design, basically one user task per screen, and contain as few UI [User Interface] components as possible to complete the task."¹⁰ Thus the functionality and the amount of information for mobile devices must be simple. Advances in Flash display technology have facilitate the creation of rich displays on small screens (see Infograf insert next page.)

DESIGN SOLUTION 1: Venice Speaks For Itself

Content on mobile media should function more as a pointer than a self-contained text. Especially in the case of location-aware applications, the text should constantly refer the viewer to his/her surroundings and not try to replicate the beauty of the site being visited. That said, some uses of video or animation might enhance a viewer's understanding of a site, especially in explaining construction or practices which can't be seen in person.

¹⁰ Sun Microsystems, "Applications for Mobile Information Devices," 2000. See: <http://java.sun.com/products/midp/midpwp.pdf>.

The Work of Infograf: Rich Displays for Small Screens

The challenge is making information accessible on small screens. Of interest on this idea of interface design is the work of a Milano design firm, **Infograf**, (www.infografweb.it), which has developed the following small content information interfaces for Palm devices:



- **Processes and hidden structures:**
(<http://pocketpc.sportextra.it/animazioni/mondovideo.html>) This animated report on the Afghani war shows how rich media can explain aspects of monuments and tourist attractions that might be hard to describe with text or simple pictures.
- **Mundial 2002:** The possibility of an interactive map with information on various sites, and the ability to easily extract more detailed information.

Distraction from The Real World:

It has been documented (Sodhi, 2002)¹¹ and frequently observed that cell phone users can lose awareness of the world around them. This distraction makes it difficult for locals to move around their own city, and can ruin the timeless, historic aesthetic of Venice.

DESIGN SOLUTION 2: Device Warnings

First of all, users should be reminded to operate the device in a conscientious manner or face fines and confiscation of the device. An atmosphere-sensitive design process for Location-Aware Devices would include beeping or even suppression of information if a tourist stops (more than 2 minutes) on a footbridge or a high-traffic area. There is also the possibility of prohibiting a wireless network in high-traffic areas. Such bans would limit the use of devices in these areas and encourage tourists to visit less-explored areas of town. Finally, there is the evocative possibility of sending important advisories through these devices. For instance, in Venice flood advisories could be beamed to all users on the device, or even more critical terrorist, weather, traffic, or political news.

¹¹ Sodhi, M. "On-Road Driver Eye Movement Tracking Using Head-Mounted Devices", University of Rhode Island, 2002. See: <http://server.ime.uri.edu/EMRL/Publications/ETRA02.pdf>. See also <http://sci.newsfactor.com/perl/story/17770.html>.

Coping With Technological Obsolescence:

Information systems for phones and even platforms for Pocket PCs are changing rapidly. Given a long development process, the products developed might quickly become obsolete. However, social practices related to the devices might remain.

DESIGN SOLUTION 3: Proven Platforms

First of all, both low-end and high-end services should be built on proven and popular technologies. This lessens the chance of needing an upgrade later on. Also, it is advisable to build a specific software component for cities to design their own content. This software should allow for the ongoing integration of new features or adapt to changing technology.

Cultural Sensitivity:

As one hotel owner told us, “Here in Venice, people are not numbers...[tourists] feel it under their skin, and they ask us questions and they follow our advice.”¹² The concern expressed in this comment is that mobile information systems will not appeal to tourists. They come to cultural centers such as Venice for rich experiences of places and people. Actually, Venice can operate as a “space of places” (Castells) suspended in one node of the global “space of flows.” Many tourists enjoy asking questions to locals, and locals pride themselves on knowing the answers to these questions. There are also hints of fear that it would be a shame if tourism information and knowledge moved away from the face-to-face interaction, which is such an important part of Italian culture.

¹² History Unwired, Hotelieri Focus Group, June, 2003.

DESIGN SOLUTION 4: Local Inclusion

This is not an easy problem to solve, types of face-to-face interaction will definitely decline as mobile technology is used to find the bus station, figure out when a building was built, and to exchange ideas. However, the hope is that these devices will allow new levels of face-to-face interaction. Tourists will be able to find other tourists and locals who share their interests and then, hopefully, arrange face-to-face encounters that would be much richer. Translation software might also facilitate bilingual conversations that never would have been possible before. There is also the key component that, since locals will be involved with the design of these systems, they will personally help tourists in using the system. They will also be able to use the system themselves to seek out visitors with whom they might have shared interests, business goals, and cultural exchange.

6 DIGITAL CHOICES: SCENARIOS & BUSINESS MODELS

6.1 Introduction

In the future good business may require
understanding how meaning is produced
Ilka Tuomi

In this chapter we present possible scenarios of deployment of new mobile-technology-based services and content for Venetian tourists and citizens. We analyse and evaluate the many variables that could weigh upon the success of a possible new project, in particular the different business models that would allow the initiative to be economically sustainable, the different types of technology, the opportunity to shape a national or international network of cities using the same type of mobile tourist system.

This all ties into the needs and visions established in the surveys, observations and interviews. Yet this section is not just a logical result of our data, it is the first step in a cycle that re-engages the tourist guides, information points, tourists, and locals that were initially questioned.

What we are proposing is not an a-b plan. We are designing an ecology of technology implementation that will be in constant dialogue with the communities of implementation. Not only does this ensure quality of product, it ensures “ownership” by the community hosting the technical implementation. (See Section 1.2).

6.2 The Different End-User Terminals

First of all, designers should consider the main device that will be used by future end-users. At present, the main technologies which are candidate for this role are:

- Cellular Phone: first, second or third generation ones
- Laptop

- Palm or Pocket PC

From the very start designers will be asked to choose which will be the more suitable and accessible user terminal, and to reflect upon the different ways and situations in which this will be used. The ones we cited above are the main end-user terminals now on the market; in the near future they are destined to evolve in more sophisticated devices, that will very likely be smaller and featuring the convergence of different media.

6.3 *Different Technologies for Data Transfer*

As for the data transfer networks, different solutions can be adopted, the one not alternative to the other:

- A. WI-FI Networks (Wireless Internet Network 802.11b) serves two purposes:
 - i. To surf the Internet and check e-mail from one's unwired device;
 - ii. This is also a way of determining a user's position through triangulation. Instead of GPS, the strength of three signals from adjacent transmission towers are measured and the location of the user is determined. From antenna audio tests, this system had an accuracy of 1-3 meters (Proctor, 2003). This system only works with applications designed to read and integrate signals from the various transmission points (i.e., Pango's Proximity Platform™).

CUTTING-EDGE EXAMPLE: SOTTO VOCE



(From <http://www2.parc.com/csl/projects/guidebooks/>)

Xerox PARC in Palo Alto, California developed a mobile tour guide system that works within a Wi-Fi network to present audio and visual information coordinated to a user's location within the museum. Using touch screen technology on a Pocket PC device (see picture above) users can select objects in the room they are visiting and get information on those objects.

Information is presented both visually and acoustically through a one-ear headset that allows them to talk with other visitors. The *Sotto Voce* has an innovative "eavesdropping" feature that allows users to listen to the audio of other visitors. Such **peer-to-peer** networking systems could offer future visitors to Venice the ability to find other tourists with similar interests, origin, or current location. Such technology could potentially allow visitors new lines of connection to locals especially through instantaneous translation, interest groups, and the ability of such devices to facilitate ongoing communication, even after tourists return home.

- B. GPS, to locate from one's device the geographical position in which one is in every moment and the path to follow to reach another location, by visualizing a map in the screen

CUTTING-EDGE EXAMPLE: INVISIBLE IDEAS



from WWW.INVISIBLEIDEAS.ORG

Similar to *Sotto Voce*, *Invisible Ideas* is an art/tourist project that plays out on location-aware mobile systems. Instead of using a Wi-Fi network to locate the devices, *Invisible Ideas* uses a GPS (Global Positioning System) attachment to a Pocket PC. GPS is a satellite system used mostly in military and naval crafts to find global coordinates in latitude and longitude. The advantage of GPS is that you don't need Wi-Fi transmitters to get location. The disadvantage is that it doesn't work indoors. *Invisible Ideas* uses GPS to trigger location-based poems to pop up on the Pocket PC screen as users walk through an especially beautiful portion of Boston. Information is presented in both text, animation, and images through software called *Flash*, which is becoming the predominant way of presenting rich media through the Web.

- C. Non-networked devices: these are devices with preloaded software which provides information on a place. There are generally two versions of this device:
- Audio guides: most audio tours of museums and outdoor areas are conducted through these types of devices. A company (antenna audio or audio guide) design a piece of software that offers information on various locations selected by the user.
 - Electronic versions of guidebooks: this basically works as an electronic guidebook (see the lonely planet applications up at <http://www.citysync.com/>).

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<input type="checkbox"/>		Civic Center	
<input checked="" type="checkbox"/>		Downtown	
<input type="checkbox"/>		Fisherman's Wharf	
<input type="checkbox"/>		Haight-Ashbury	
<input checked="" type="checkbox"/>		Marina	
<input type="checkbox"/>		Mission	
<input type="checkbox"/>		Nob Hill & Russian Hill	

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D. Simple phone:

- a. Here we have phone numbers you can dial to get information on a where you are standing. They usually are toll calls, such as the Austrian TELECOM initiative: by mobile phone you dial the no. 333 and you get to the A 1 City Guide. They tell you that you have to pay 1,50 Euro and then you have to press various buttons to get the information.
- b. WAP Phones: GPRS phones and 3G phones have the ability to receive wap content and become location aware by identifying the access tower. Most of these services are provided through telecom companies and are on a for-fee basis.

Maintaining the limitations and costs noted above, we can compare the various alternatives and figure out what kind of devices are needed to build the desired features outlined in the preceding sections.

CUTTING-EDGE EXAMPLE: the case of AT&T'S *m-MODE*



SEE <http://www.attws.com/mmode/features/>

m-Mode is a subscription service available to cell phone subscribers on AT&T's network. You can think of *m-Mode* as a marketplace for games, ring tones, media, and entertainment on your phone. You connect to *m-Mode* via the GPRS protocol or 3G protocol in Europe. What is appealing about this mode of connection is that it doesn't require any extra attachments to your phone (if your phone is 2G or higher) or the construction of a Wi-Fi network. *m-Mode* has location-awareness, but to the degree of kilometers rather than meters like GPS and Wi-Fi locations systems. Similar to building a website, Venetian civic and commerce organizations can design subscription games and media for *m-Mode*. Features in this system could include cultural information, timetables for events and transportation, ticket purchasing capabilities, maps (although hard to read), and historical and/or cultural games.

6.4 *Models of Innovation, Social Practices and Business Failures*

History Unwired Project is one among numerous attempts to innovate and to deploy technology for different purposes. Tuomi (2002) distinguishes two models of innovation: “The traditional view assumed that invention happens when a new concrete artifact or mental insight is created. [This] point of view on innovation was based on the idea that innovation is well represented by the material object that embeds the invention. A prototypical innovation, therefore, was something like a steam engine or a light bulb.” (Tuomi, 2002: 13) In our case, it might be the invention of “the best mobile device” and the “best application and content” from the lab for tourists.

The alternative view starts from a very different assumption: it is the user --and her broader community-- who invents or reinvents the product. Innovation is a social phenomenon. As Tuomi puts it, “Innovation is generated in complex interactions between several communities, each with their [sic] own stocks of knowledge and meaning. Technological designs and social practices co-evolve. Therefore all innovation is fundamentally social innovation” (Idem: 23).

This perspective resonates with what we have done so far. Instead of thinking and designing a technology from MIT to be deployed in the field, we went to Venice to observe Venetian tourists and locals and, moreover, to live as Venetians and explore through actual and imagined mobile technology applications.

Our starting point is that every innovation has to be rooted in an ecology of communities. Moreover, it has to be rooted at the intersection among communities: the technological design has to be in an ongoing dialogue and feedback with users in the communities. We believe that a community-centered design process is the door to a successful product and business plan.

Since our project is a good idea, but an idea nonetheless, we need to remain sensitive to the social habits, time constraints, financial resources and pre-conceptions. Below we, briefly, describe, three case studies of technological innovation, consumer behavior and social practices that are in one way or another related to ours. Some of them didn't materialize. Others are still in the formative process.

6.5 *Understanding Failures or Learning from the Field*

6.5.1 HERITAGE

HISTORIC ENVIRONMENT FOR INTEGRATED TELEMATICS APPLICATION PROGRAMMES IN EUROPE

Heritage was an ambitious project that tried to use sophisticated information technologies to update current practices in five European cities. Compared to History Unwired, Heritage is a much broader project with an “expected effect” in different levels of practice (tourism, parking management, document issuing, event ticketing, information for business and citizens, hotel booking, local administrative services, data collection systems, traffic control, etc.).

The cities involved were Verona, Bath, Salzburg, Funchal and Carcassone. The project got funding by the Commission of the European Communities.

At first glance we can say that the project didn’t take into account social practices, that is to say, the way tourists and citizens conduct their day-to-day activities. It was designed to organize everyday life and events, and to manage traffic control and move information across services.

This is an interesting and ambitious project aimed at transforming urban practices. It is a highly technical engineering project. It is possible to glimpse this sort of orientation from the very beginning of the project description: “Within this document we will use the terms ‘application’, ‘function’, and ‘service’ as synonyms....The task of this paper is to specify the functional architecture of our future HERITAGE integrated system by identifying all functions it performs and the data flow exchanged between them.” (Heritage, 1998). The project assumed the central problem of community information systems to be one of “data flow” rather than understanding community needs and building technologies on a human scale.

The HERITAGE project is divided into three sections: the first one describes *state-of-the-art* existing applications, describing the functionality of existing services, their basic infrastructures, technology, accessibility, user interface, and data platform; the second one describes *potential applications* which might be integrated in the HERITAGE system by highlighting the functionality of each new application; finally, the third one

specifies a *functional architecture* highlighting both functions performed and data flow needed for the HERITAGE Functions Integration in the five cities.

Even though we are thinking about “scaling up” our project to other cities in Europe, at this point we are focusing on Venice. Therefore, we will review Heritage related to Verona, which might be considered a city within the “context” of Venice.

6.5.2 The case of Verona

In Verona one of the most innovative applications is a service provided to citizens by the local administration, whose purpose is the automatic issue of official documents. Another important application is the *Arena* ticket-booking facility serving the summer lyric period, one of the main attractions of the city that draws a substantial number of visitors. Moreover, the provision of information about the city (map, museums, hotels, cultural and social events, pollution episodes, public transport, trip planning, etc.) is an important service for both citizens and tourists. Last but not least, public transport company offers a service which targets disabled and elderly people having mobility problems.

A number of interesting and advanced applications will be investigated in line with the objectives of the HERITAGE project. The applications to be investigated are the following:

- Parking management
- Payments integration
- Automatic access control
- Automatic hotel reservation
- Organised car-pooling
- Urban traffic control (UTC)
- Automatic vehicle monitoring (AVM)

The Strategies Management System performs three macro-functions: (i) it manages the communication with multimedia terminals (i.e. in-street terminals) and (ii) it operates home and office terminals, and (iii) it defines strategic decisions.

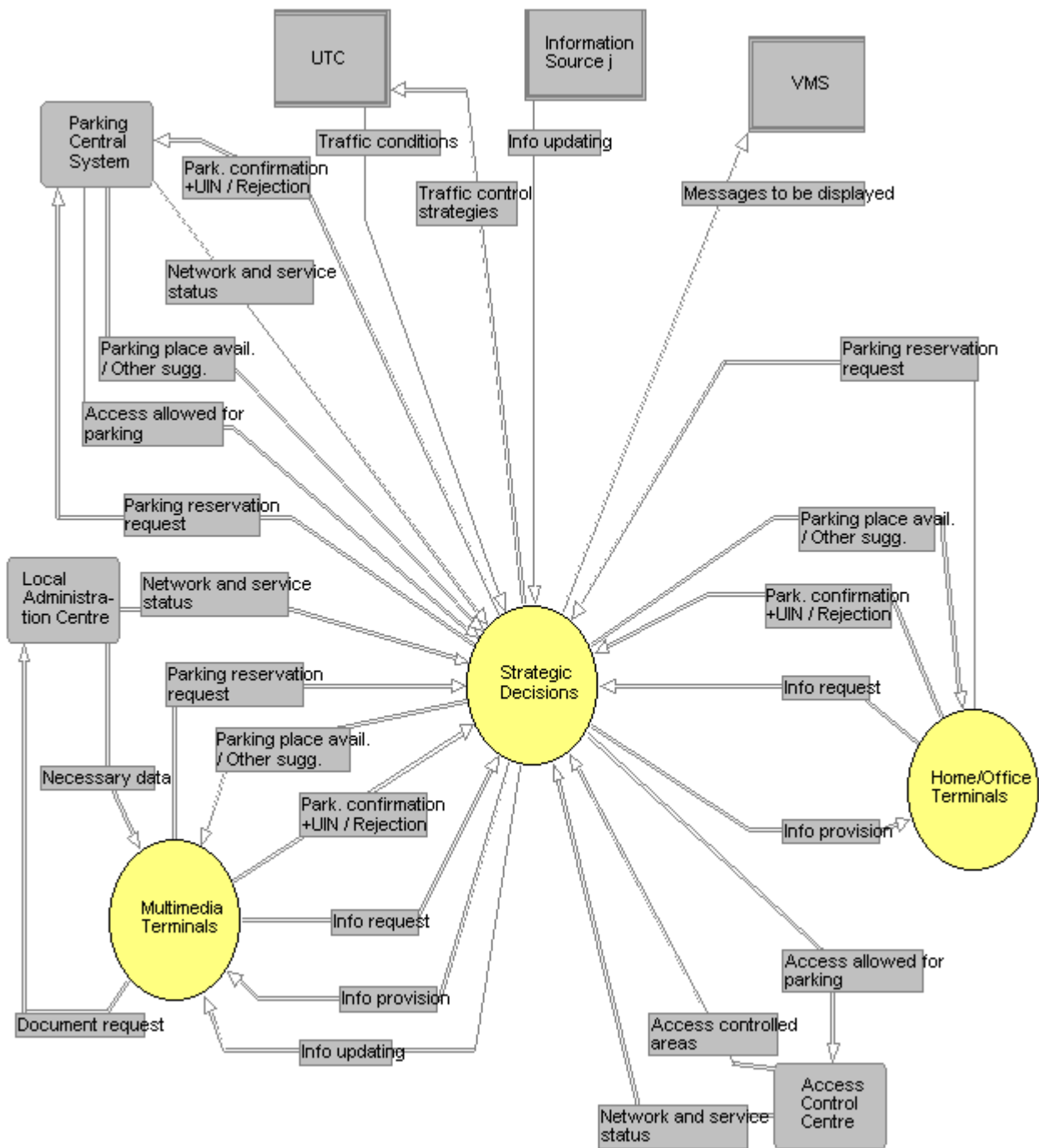


Figure 16 HERITAGE Architecture

Multimedia terminals (in-street terminals)

Functions performed by the Multimedia Terminals, include the following:

- Parking place reservation

- Information provision
- Local Administration service (Documents issuing)

6.5.3 Information provision

The multimedia terminal presents the user all kinds of available information, which might be provided by different suppliers.

As far as databases are concerned, two solutions can be taken into consideration:

1. All information is stored and held by the data provider which answers requests forwarded by the multimedia terminal; or alternatively
2. Some basic (static) information can be stored on a local storage device held by the terminal itself and extra or dynamic information can be requested directly from the data provider.

Despite these specifications and sophisticated propositions about how such systems will actually work and improve current information systems in Verona, they seem to us very broad and ambitious for real and sustainable implementation. Remember that we described here only Verona's case, but this project also involved research and implementation in four other European cities.

In general we lack any account about how communities will use this sophisticated platform of servers, databases, and functional architecture of this integrated system. This reason, among others, could explain the failure to implement this interesting "idea".

6.6 Future Center of Telecom Italy (San Salvador Venice)

The Future Center that Telecom Italia in the renovated Venetian Convent of San Salvador offers a tour of the future in the heart of historic Venice. It attempts to bring new information technologies such as games, graphic user interfaces, and virtual reality journeys together with classic Venetian avatars such as Marco Polo, key *Ducces* and other historical characters. This journey promises much, not only in terms of new

communication technologies, but also regarding the choices their development offers all of us, and the often-subtle implications involved in their becoming part of our lives. The idea underlying these systems and interfaces is to connect the future with the recent and distant past through virtual story-telling in desktop computers.

The rooms for interacting are in the Convent of San Salvador, which is situated on the way from St Marks Square to Rialto Bridge. The design of this “technological space” is intended to get the tourist away from her physical experience in “real Venice” to actually experience “cyber Venice”. It seems to us that the technology design concept behind the Future Center in San Salvador substitutes for the experience of visiting Venice rather than complementing the process of visiting and exploring in real time. What is the value of going inside a renovated Convent --away from current life-- and to experiment with Graphic User Interfaces about ‘artificial’ Venice? What is the excitement of playing games whose content is removed from Venice and its practices? What is the value added?

During the fieldwork for this project we went for two days to the Future Center where we saw almost nobody. It was June, when thousands of visitors arrive every day and over-crowd museums, streets and cultural venues. Why was nobody there? What can we learn about this project?

We don’t expect to have “the” answer, but what follows are some clues that might be helpful for our own project about bringing communication technologies to tourist and local practices. We address three main points:

First, all attempts to bring technology to communities have to take into account the context of such community. In other words, it is different to deploy technology in Boston (Newbury Street, see below), Guatemala city, India or Venice. The starting points of technology implementation are different and may influence the success or failure of such attempts. The community-centered design approach takes into account such contexts.

Second, as we stated above, we think the Future Center’s philosophy considers its design concepts as ends in themselves. Rather than using technology to enhance visitors’ experience and to complement current practices, the Future Center designs a very

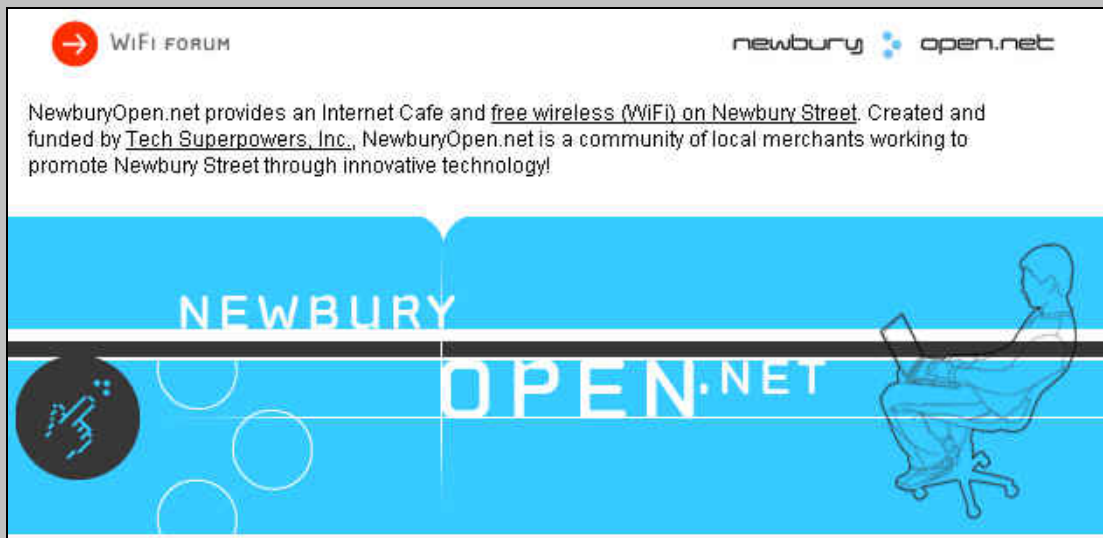
sophisticated, self-contained area isolated from the rest of Venetian activities. We don't see any human need to be fulfilled, demand to be articulated (Kodama, 1995) or opportunity to be explored. Based on our data, we seldom see meaningful technologies that appeal either to locals and tourists.

Third, the Future Center project faces the limitations of desktop computing, which include being bound to a specific place. Desktop computing is still useful and meaningful for workplace activities, home computing and cyber cafes. However, for a tourist who usually spends between 1 and 4 days in Venice and is willing to visit as much as he/she can, going to a place to experience *cyber Venice* and to play games does not seem worthwhile. Mobile computing seems a more appropriate option. A portable device with practical and cultural information using location-aware systems and data transfer while on the move seems to us a more reasonable and feasible option for bringing information technology to the Venetian practices.

6.7 New Revenue Models

As mentioned in section 6.3, wi-fi connected devices offer networking and location-awareness features that could greatly enhance mobile technology networks. Implementing a Wi-Fi network may seem difficult from a financial perspective, but costs are actually not that prohibitive. With access nodes running around \$600 USD and prices falling, large-scale wireless networks don't have a high initial cost and can be supported by service providers running occasional advertising, or by businesses that wish to attract customers with the draw of free wireless services.

CUTTING-EDGE EXAMPLE: Newbury St. Wireless Network, Boston



SEE : <http://www.newburyopen.net/>

A computer reseller in Boston is spearheading a new form of "philanthropic advertising" that offers free wireless Internet access to the local community, with subtle branding. [Tech Superpowers](#), a Boston-based Apple reseller, is building a small, high-speed Wi-Fi network for local residents. Bostonians get to log on for free, as long as they put up with a pop-up advertisement every three to four hours. The network's access points can be found in eight separate businesses along Newbury Street: in cafés, restaurants and bookstores. It attracts a few dozen regular users, and scores of irregular ones. There are no access charges, membership agreements or login screens. The periodic pop-ups appear only if the user is browsing the Web. Glenn Fleishman, a Wi-Fi expert and author who runs the authoritative [Wi-Fi Networking News](#), said that, to his knowledge, NewburyOpen is the only community Wi-Fi network run by a commercial company. "More companies are finding that offering free wireless network access costs them next to nothing, but allows them to easily give something back to the community," he said. "It's good publicity, but it's also a good work."

7 CONCLUSION: HOW TO PROCEED

While the preceding examples point to some technological pitfalls and potentials, we believe that a “smart city” will only arise in ongoing dialogue/prototyping with the Venetian community, government, residents, tourists and local business owners. How does this happen? We believe that it takes several components: orbital design, a larger civic campaign, corporate partnerships, and enlightened community training programs.

7.1 A Comprehensive Civic Program

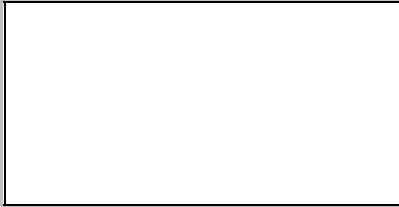
From our observations of tourist and local behavior we realize that there is a delicate ecology at stake in Venice. The dominance of the tourist economy is creating wealth and gobbling up nonreplishable resources. As mentioned in the introduction to this document, since 1951, Venice’s Historic Center has undergone a 60% population decline. Sections of the city are overcrowded. Trash and flooding are expensive and expanding problems. Local businesses are turning to tourist services and in general Venice is becoming unlivable for locals.

Venice’s *Strategic Plan* does make an attempt to address these issues (transportation reform, Arsenale redesign, training programs, etc.), yet lacks an identifiable, focused campaign. In tandem with the “Save Venice”, the City of Venice might initiate a “Save Local Venice” campaign. This campaign would comprise an **umbrella of training programs, urban design projects, legal reforms, and technology implementation** to make Venice a city of the future as well as the past.

While this all sounds nice, it is much more difficult to implement. What does it mean to create policy that conserves and progresses? To a degree Venice has always been both—strictly enforcing building codes while designing a cutting edge locks in the Lagoon to control flooding (Project MOSES), fabricating gondolas and driving high-tech speedboats, chatting for hours on *ponte* steps and always packing a cell phone.

One starting point for envisioning how this could translate to civic programs is the Slow Food Campaign.

PROGRESSIVELY CONSERVATIVE: The Slow Food Campaign



SEE : www.slowfood.com

The Slow Food campaign was started Cuneo Province in Italy as a grassroots movement to preserve taste in food. The organization's founders call themselves "eco-gastronomes" referring to their vision of an intimate connection between food production, preparation, and consumption. They provide a large array of services including cookbooks, subsidies for endangered foods and cooking practices, and education programs. Their numbers are impressive, having expanded to 48 countries and 77,000 members in the past 14 years.

What's most powerful about the organization is it's balance of new techniques with traditional tastes. Slow Food has a real community "ethos" that is often lacking in large-scale technology projects. The project relies greatly on volunteerism and local input for future direction. Such an organic feel is essential to the implementation of a successful, city-wide mobile technology implementation.

7.2 *ORBITAL Design*

We should re-emphasize that content is king for these devices. No matter how sensitive the implementation or high-tech the devices, if the content is not meaningful or the delivery devices do not work, people will not use it. The contradictory nature of technology design is that funding often goes to projects that use technology that is not tried and tested. While we definitely want to innovate, we believe that Venice should start the move to mobile technology information with small steps that work—technology that addresses tourist and local needs rather than technological curiosity. The idea is that this kernel can grow. We call this approach orbital design. The question is what is that kernel to start with?

“We love maps!” was a common comment from tourists. This may be a statement of desperation or of actual love (often depending on if tourists were lost or not), but in any case it indicates an attachment to a specific type of paper-based media. The first step in orbital design would be to work with some of the more effective paper-based media. Rather than replace and consolidate all paper-based media, initial systems might work well alongside paper. This hybrid paper-digital approach adds **analog redundancy** to digital information services. This redundancy will serve as a backup plan if digital devices fail, do not catch on, or turn out to be cost-prohibitive for many.

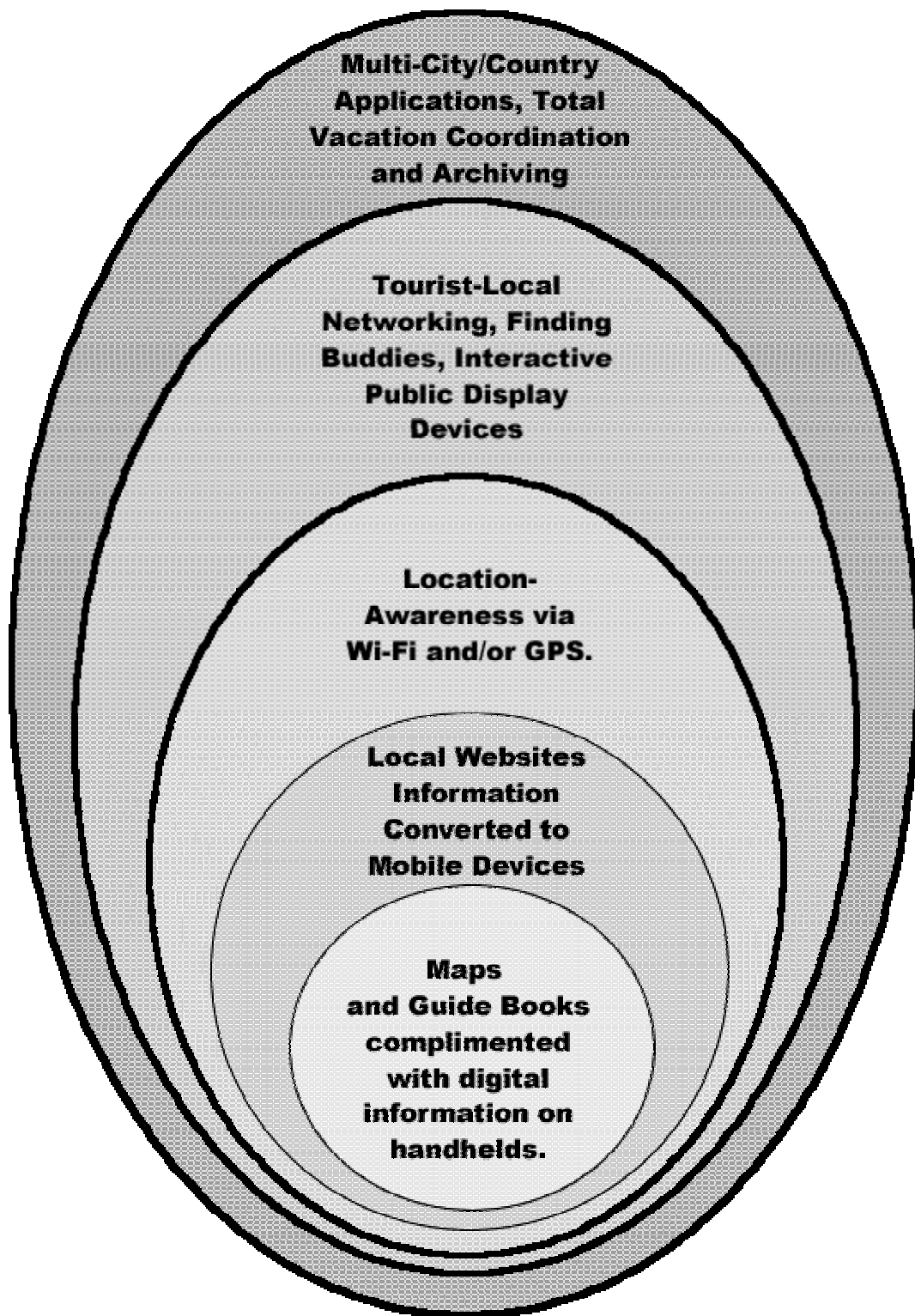


Figure 17 Orbital Design Moving from Paper-Based to Fully-Networked Wi-Fi Devices.

7.3 *Local Website Conversion*

The next task would be to make it easy for local businesses and civic organizations to convert their existing websites to a digital format. This process would involve a reduction of information due to smaller screen space, but it might also tie into the hoteliers insight into the desirability of less information. According to one hotel owner, tourists “prefer to discover on their own...you can give them information that can help them for the main things, but let them discover on their own...don’t tell all.” (Personal Interview, History Unwired, June, 2003.) Such a design challenge would closely involve local input as to what are the main things to be included on mobile devices and what should be left to discovery. Another intriguing challenge is to give the right hints of what to do without prescribing exact courses of action.

7.4 *Location-Awareness*

Tourists varied from very excited (modern families) to not interested (history lovers) when questioned about having devices that could determine their location. Thus, while such technology makes sense for a city in which people often get lost, we place it further out in the design process. Similar to the hotelier reaction, knowing where you are at all moments may ruin some of the mystique of Venice. In addition, this technology is far from perfected. Making systems that depend on location-awareness would lead to frustration at this point.

7.5 *Tourist-Local Networking*

Tourists and local networking is fairly easy in Venice due to its pedestrian construction. Bridges, ubiquitous cafes and bars, and many shady plazas afford frequent casual interactions. These interactions are increasingly carried on electronically as tourists and locals use their cell phones to exchange numbers and stay in touch via SMS or phone after they return home. Such interactions could be facilitated in the future due to “buddy-finder” applications that survey your interests and find other users with the same interests. Such software could also combine with location-awareness to show you buddies in your area. There is

something a little bit anti-Italian about this approach, as some hoteliers pointed out that many people come to Italy to have impromptu street interactions and get away from digitally mediated communication. While networked devices might refine and even increase the possibility of “impromptu” interactions, tourists expressed little “need” for such software. Leaving this functionality in the outer orbit of design leaves the system open for such features if and when locals and tourists find a real need for it.

7.6 Multi-City Applications



The design of mobile systems in Venice should be scalable to other cities. What this requires are agreements with civic and private institutions in multiple cities to standardize mobile content. This could be really helpful to tourists to be able to look ahead or look back at other destinations. With a single device and application tourists could take care of

Figure 18 Network of Mobile Technology Cities

reservations for upcoming cities and also link the architecture they are seeing in Venice with similar buildings they saw in Florence.

7.7 Corporate Partners

For the technology implementation project to work, the municipal government needs to find corporate partners that are committed to community success. Such a company should not be necessarily selling solutions, but be interested in learning about how to implement a civic-wide technology program. This would involve education exchanges with community groups. Such a company would not be married to any specific technology, but be able to deploy subject matter experts as specific needs arise. Their process of engagement would be long-term and open.

7.8 *Opening the Design Process*

If this is the Information Age, then training is its key currency. Possibly one of the saddest things about the previous technology failures is that very little of the building process was open to the community, so that when the technology failed, its lessons were buried with them.

One of the advantages of community-centered design is that the information systems begin to “work” even before they are “working.” That is, by training community members in, say, turning web content into mobile device content will provide immediate benefits to a new technology system. Creating a tech-savvy workforce may slow down the implementation, but it adds a redundancy. That is, you are assured some positive community impact (education), even if the technology itself is never completely adopted.

7.9 *Custodians*

New technology inevitably requires some guidance. While reading instruction manuals, pushing help buttons, and contacting customer service can be some of the most deadening experiences of the modern age, Venice might offer a **living help system** that turns the streets into a human help menu. Knowing how to operate advanced tools and software may enliven local-tourist interactions. Beyond the endless parade of “where is the Vaporetto?” Venetians might start showing tourists how to archive photos, make a reservation at a restaurant, and find the flood forecast. Just as buildings have undergone careful restoration, so might local/tourist interactions be renovated through tools that Venetians help design and implement.

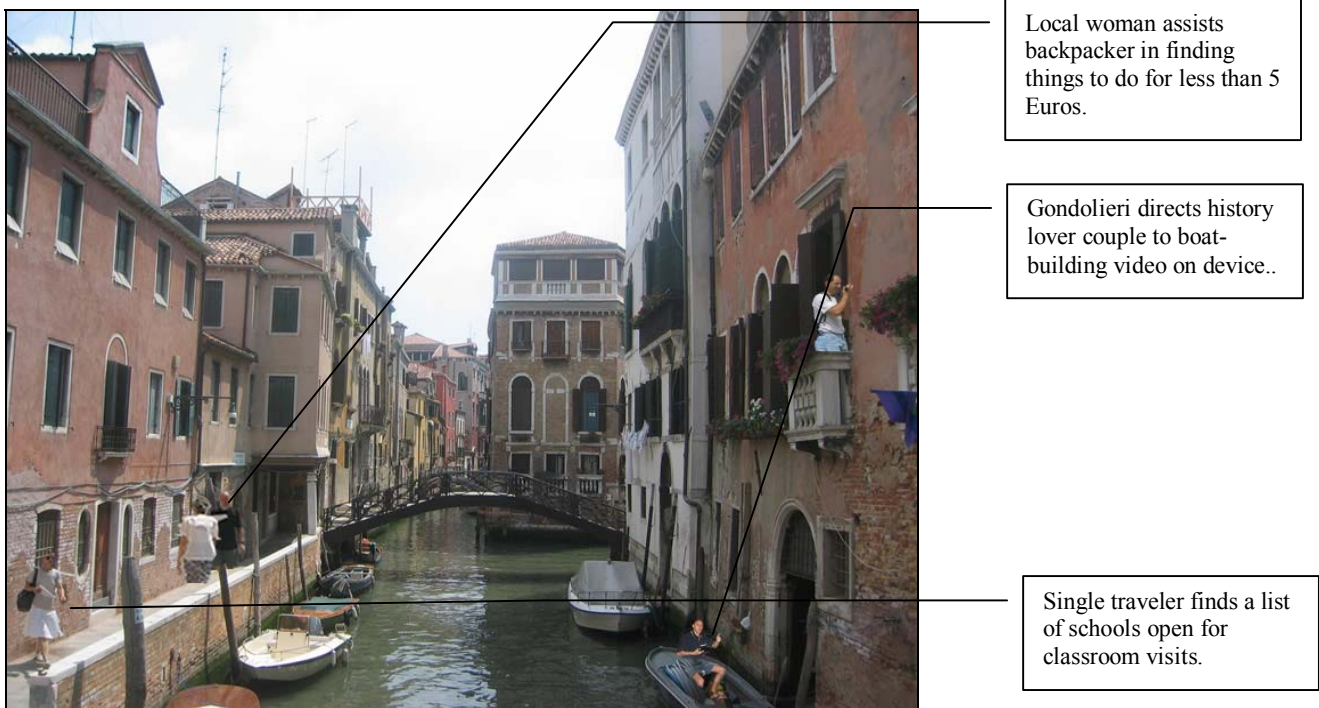


Figure 19 Local Custodians in Action

7.10 Final Vision: Local Inclusion

Returning to a local perspective, “Here in Venice, people are not numbers...[tourists] feel it under their skin, and they ask us questions and they follow our advice.” (Personal Interview, History Unwired, June, 2003.) The concern expressed in this comment is that mobile information systems will not appeal to tourists. They come to cultural centers for rich experiences of place and people. They enjoy asking questions of locals and locals pride themselves on knowing the answers to these questions. There are also hints of fear that it would be a shame if tourism information moved away from the face-to-face interaction, which is such an important part of Italian culture.

Information sources can connect as well as divide populations. As long as Venice remains a walking city, face-to-face interactions will always proliferate. So will tourist needs for information. History Unwired will only succeed if information renovation becomes a process to educate the location population,

increase global connections, and model hybrid interactions with both analog and digital resources.

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- <http://www.turismovenezia.it>
- <http://www.seevenice.it>
- <http://www.slowfood.com>
- <http://www.invisibleideas.org>
- <http://www.citysync.com>
- <http://www.attws.com/mmode/features>
- www.wired.com
- www.infografweb.it