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MEDIATION, EXPANSION AND IMMEDIACY: HOW ONLINE COMMUNITIES REVOLUTIONIZE INFORMATION ACCESS IN THE TOURISM SECTOR

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Abstract

Enabled by Information & Communication Technologies (ICT), online tourism communities are in the process of revolutionizing the way information is shared and distributed in the travel industry. Interpreting online tourism communities as a particular kind of information system, previous research in this area has argued that tourism communities may enhance the quality of information available to tourists, thus improving their subsequent travel experience. Quality was defined in terms of timeliness, completeness, structure and personalization. In this paper, we review this notion of quality and argue that particularly valuable information coming from tourism communities often meets stronger quality characteristics related to information relevance and impact, namely mediation (information helps establish an own, independent perspective on destinations that is not primarily mediated by guide books and travel-related media), expansion (information provided is highly relevant even though it not directly related to the original inquiry to the community) and immediacy (information is not caught in the time-space dilemma of guide books and similarly sedate publications). The three quality characteristics were derived from an empirical investigation of information shared in a well-established online tourism community focusing on traveling in Australia. The paper concludes with a discussion of how mobile information systems, such as laptops and personal digital assistants, are changing the way travelers interact with online communities.

Keywords: Tourism information systems, online community, collaboration, mobile tourism.

1 INTRODUCTION

The importance of the Internet as an information exchange and communication medium has increased significantly over the past few years. A number of scholars, notably Castells (1996, 2001); see also Eriksson (1999), suggest we are witnessing the rise of the network society as the daily lives of people are increasingly affected by information technology and network-related services. Compared to the also quite popular term information society, the term network society pays more tribute to the fact that processing information has been important for decades while networks have only recently begun to re-define notions of time and (physical) location. Arguably, we are witnessing the early phases of a societal transformation that will be as dramatic as the first two industrial revolutions that are commonly associated with steam and railways, and electricity and the automobile, respectively. In analogy, networks have effects similar to those of railways whereas non-networked (but nevertheless information-processing) computers have had effects more similar to those of stationary steam engines.

With regard to information distribution in the travel industry, it is important to consider how computer networks have revolutionized the way information is distributed and accessed (c.f., Lueg 2001; 2002). Enabled by Information & Communication Technologies (ICT), online tourism communities are in the process of revolutionizing the way information is shared and distributed in the travel industry. Prior to the advent of the Internet and the World Wide Web, in particular, tourists were more or less passive consumers of information disseminated via printed guide books and traditional media, such as broadcasting, television, and glossy magazines. In contrast, the Internet has enabled consumers to actively retrieve information provided by a variety of additional sources ranging from web sites operated by guide book publishers, such as Lonely Planet's online forums, to independent online travel communities, such as Usenet's de.rec.reisen.misc community or the web-based australien-info.de community.

Online communities are known for quite a while to be powerful information sharing habitats (e.g., Lueg 2001). More recently, Schwabe and Prestipino (2005) explored an information systems perspective to review information quality characteristics and concluded that traditional discussion-based online tourism communities may provide more timely, more complete, better structured and more personalized information than commercial guide books. In this paper, we provide empirical evidence suggesting that under certain circumstances, different qualities of information provided by travel communities may well exceed what Schwabe and Prestipino (2005) summarized as quality characteristics.

In particular, we argue that quality information coming from tourism communities may exhibit one or more of three finer-grained characteristics which make the information particularly valuable. First, tourism community information enables users to establish their own, independent perspective on destinations in a way that is not exclusively mediated by guide books and tourism related media ("Mediation" quality). Second, information from tourism communities has the capability of re-directing information seekers to information that is not directly related to their original questions but nevertheless highly relevant ("Expansion" quality). Third, tourism community information can bypass the time-space dilemma faced by guide book authors who are forced to abstract (to some extent) from the specific characteristics of tourist destinations (e.g. seasonal changes) in order to avoid information overload and updating issues. Often, however, it is exactly what we call immediate information that travelers need and therefore seek ("Immediacy" quality).

We proceed as follows. After discussing research goals, methodology and data collection we summarize related work and the notion of information quality in the context of tourism communities. Then we discuss the three specific characteristics of information quality that refine and expand the informational qualities proposed by Schwabe and Prestipino (2005). The three finer-grained characteristics we identified were derived from an empirical investigation of information shared in a well-established online tourism community focusing on traveling in Australia. After discussing the findings in a broader context, the paper concludes with a discussion of how mobile information systems, such as laptops and personal digital assistants (PDA), are changing the way travelers may interact with online tourism communities.

2 RESEARCH GOALS, METHODOLOGY AND DATA COLLECTION

There is a considerable amount of research into the nature of communities --be it "real world" communities (e.g., Wenger 1998; Carotenuto et al. 2002) or virtual (online) communities (e.g., Smith and Kollock 1999; Preece and Maloney-Krichmar 2005)-- but there is surprisingly little research into the "informational value" of communities in the context of the rather information-intensive tourism business (for exceptions see the Related Work section below). The research presented in this paper builds on work by Prestipino (2004) and Schwabe and Prestipino (2005) exploring community-delivered information along information quality dimensions timeliness, completeness, structure and personalization. In particular, we expand and refine the quality notion they suggested. We do so by outlining a set of characteristics of particularly valuable community information.

Data collection is based on conversations in independent online travel communities, such as Usenet's de.rec.reisen.misc community and, in particular, the commercial but relatively independent australien-info.de online community. The latter is a web-based community that was founded in 1998 (<http://www.australien-info.de/ueberdlp.html>). Discussions are typically held in German.

We decided to limit our data collection to the "information window" of four weeks as this is exactly what users of such communities would experience. In most online communities it is common practice that contributed information "expires" after some time which means the information is removed as part of regular community maintenance. Reasons for expiring include saving storage space, reducing information overload and last but not least removing information that is likely to be outdated. Contributions to the australien-info.de web community expire, as indicated above, after four weeks.

The four-week "information window" in late 2005 we looked at comprised

# Threads (# initial questions)	# answers (contributions)	# times read
170	909	46,080 (sic)

which indicates quite significant interest in the topics covered by the community. All 170 initial questions were looked at and respective discussions were reviewed for specific characteristics. For technical reasons, we could not determine the number of distinct contributors (which must be registered as members) because of the way the community is implemented (php and javascript retrieving contributions instead of direct links via URLs) does not permit downloading the content for off-line processing.

Focusing on community information featuring *specific* information quality characteristics is not meant to imply that *all* community information demonstrates these characteristics. Apart from the glue that is social chatter, information provided by community members can be rather generic information that could also be gained from studying guide books. Conversely, information requests towards communities may also be of rather generic nature which suggests that at least a fraction of information seekers don't prepare themselves by studying guide books or other "passive" information resources. Possibly, they expect to be able to retrieve the information without much effort from the community being an "active" information source anyway. A well-known issue is that such "free loading" behaviors consume (human) resources and often mean that experts willing and able to spend a certain amount of their time on helping others have less time answering information requests that actually require their subject matter expertise.

Similar to other research in this particularly dynamic area, we see this research as exploratory, qualitative work aimed at gaining a deeper understanding of the nature of the research questions rather than at presenting the results of rigorous research. In areas like the one investigated in this research, deriving statistically sound conclusions is extremely difficult due to regular expiry (removal) of contributions and volatility of membership in many online communities. It seems that often,

"membership" in online communities is nothing more but a momentary manifestation of connections and conversations: many of today's "online nomads" do not join communities but merely use them for their information seeking purposes. In a way, such information seekers resemble what has been called "empowered fruit flies" in the context of e-business: customers who have no time, little allegiance, quick evolution, and all the power. Customers who move swiftly from one sweet fruit to the next in search of the best pricing, highest convenience, and quickest satisfaction (Colony 2000).

3 RELATED WORK

The role of online communities in enhancing tourism is a rather new field largely ignored by research (Schwabe and Prestipino 2005).

At ECIS 2004, Walden et al. (2004) discussed mobile challenges for travel and tourism, in particular the expectation that travelers' and tourists' lives will be enhanced by smart services, accessible via mobile devices anywhere and anytime. Intelligent software technologies will allow mobile services to be personalized and context-aware to improve travelers' and tourists' experiences. Context-aware mobile services will make a difference as the services and contents adapt to both the environment and to personal interests (Walden et al. 2004).

Interpreting online tourism communities as a particular kind of information system, Schwabe and Prestipino (2005) argued that consulting such tourism communities may enhance the quality of information available to tourists. Drawing on work by Bailey and Pearson (1983) and Rittberger (2000), they defined quality along the dimensions timeliness, completeness, structure and personalization. Their argument is based on a total of three studies observing information quality. The first study analyzed how well the community answers information requests from their members. Their second study covered the same perspective, but took a closer look on how fast the travel related questions were answered. The second study also compared the quality of the retrieved information with the quality of the information in a commercial guide book. The third study compared the information quality of the guide book and information provided by the community on the basis of eighteen questions. Focusing on specific characteristics of particularly powerful community contributions, the research we present in this paper complements and sometimes refines Schwabe and Prestipino's (2005) work.

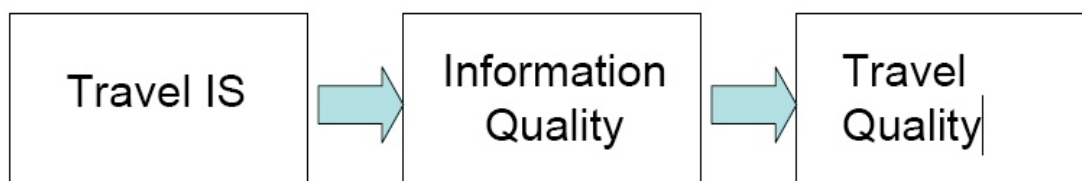


Figure 1 Travel IS influence information quality. Information quality influences travel quality (figure from Schwabe and Prestipino 2005). Information quality is then further structured into timeliness, completeness, structure, and personalization.

Exploring a possible role of location as a distinct dimension in knowledge management, Lueg (2004) outlined ways to link virtual tourism communities and physical locations. Anecdotal evidence presented suggests that establishing the connection was feasible using technology widely available at that time and that all stakeholders involved would benefit. The connection would be of most value to tourists though as they would be able to access a range of different opinions and perspectives while being involved in exploration activities. One of the main arguments is that connecting travelers to virtual communities would be an elegant way to address the diversity problem (e.g. not every reader of

a guide book is interested in information about sites of military activity or information for Gay and Lesbian travelers) in a flexible way. Virtual communities tend to represent a diverse range of interests and are also able to accommodate changing interests or interests that are not necessarily "typical" of a specific class of tourists (Lueg 2004).

At the CAUTHE 2005 education in tourism conference, Lueg and Bidwell (2005) discussed using mobile, wirelessly connected electronic devices in tourism settings and, in particular, how these devices could be used to provide way-finding knowledge in such a way it could be used to attract and guide prospective customers to sites of interest. Lueg and Bidwell also discussed ways to broker way-finding knowledge within the user's community of interest such that the knowledge becomes a community-authored resource. Tourists would be enabled and encouraged to share their domain knowledge and "best practices", such as descriptions of routes they found particularly pleasant.

4 FRAMING THE POWER OF COMMUNITY INFORMATION: (RE-)MEDIATION, EXPANSION AND IMMEDIACY

In this section we focus on exploring three distinct characteristics of information quality in the context of community information, namely mediation, expansion and immediacy. We will provide empirical and anecdotal evidence that these characteristics are key dimensions of particularly useful information that in most cases could not be retrieved from traditional guide book-type information sources. The investigation is mainly based on information shared in *australien-info.de* which is a well-established online tourism community focusing on traveling in Australia. In addition we include evidence from Usenet's *de.rec.reisen.misc* community (the abbreviation "rec" stands for recreation; "reisen" is German and means travel).

As mentioned earlier, focusing on community information featuring specific quality characteristics is not meant to imply that *all* community information demonstrates these characteristics. As a matter of fact, the kind of information we are highlighting may be a rare find. There is some evidence, however, that information featuring these characteristics tends to be particularly valuable and potentially far more beneficial to travelers than information that is provided by guide books and similar sources.

4.1 Mediation quality

To a significant extent, tourism knowledge and in particular, expectations regarding destinations are still mediated by printed guide books and traditional media, such as broadcasting, television (especially popular travel shows such as "Wolkenlos" in Germany or "The Great Outdoors" in Australia), as well as glossy travel magazines (c.f., Crouch et al. 2005). Prior to the advent of the Internet and the World Wide Web, in particular, tourists were more or less passive consumers of information disseminated through these media. In contrast, the Internet has enabled consumers to actively retrieve information provided by a variety of additional sources ranging from web sites operated by guide book publishers, such as Lonely Planet's online forums, to independent online travel communities, such as Usenet's *de.rec.reisen.misc* community or the independent commercial *australien-info.de* community.

We argue that key to understanding the power of online communities is not the timely provision of up-to-date information but the way online communities can identify a certain state of tourism knowledge and (re-)mediate the user's knowledge and also expectations regarding destinations:

Hypothesis 1: online communities can identify and (re-)mediate a certain state of tourism knowledge.

The hypothesis is supported by a rather typical *australien-info.de* conversation in response to a question posted on 17-11-05 ("Darwin --> Alice Springs"; both cities are located in Australia's Northern Territory). A user posted his personal travel schedule and asked for feedback. Community members who know the Territory and its attractions identified certain issues (e.g., too much time

allocated for seeing Darwin; too much time allocated for seeing Kakadu national park; no time for either Litchfield or Nitmiluk national parks; not enough time allocated for seeing Broome) and proposed a number of changes (in particular, spending less time in Darwin and Kakadu; spending 2 days exploring each Litchfield and Nitmiluk national parks; spending a couple of days in Broome).

What basically happened is that community members challenge the user's perception that Darwin and Kakadu deserve so much more time than other sites of interest. This perception is generally in line with ways Australia's Northern Territory is advertised by government-owned tourism agencies (in particular, the message that Darwin is more than just the point of departure for a trip to Kakadu--which is to some extent challenged by the community member and subsequently re-mediated). The community feedback lead to the information seeker revising their original travel schedule.

A different user inquired about (tourist) hostels in Perth ("backpacker; perth; single" posted 16-11-05) and mentioned that he already studied descriptions of a number of hostels on the web. It wasn't mentioned but it seems reasonable to assume that the user referred to advertising type of information published on travel web sites and/or web sites maintained by respective hostels. In order to better understand the value of the information (as well as re-mediate perspectives on those hostels as suggested by the sites he visited) the user asks explicitly for feedback by someone who had been to the hostel himself or herself.

Another example is a discussion about crossing Australia's Simpson Desert in a four wheel drive ("Simpson Desert", posted on australien-info.de on 01-11-05; see also the "immediacy" section for a different aspect of the subsequent discussion). The initial inquiry was about the best time to travel and whether the Frenchline or the Rigg Road (both remote outback tracks) would be the better choice. Within a week, the thread included a discussion of the dangers of exploring Australia's outback (after all, one of the most hostile areas in the world) and, in particular, experiences suggesting that some four wheel drive rental companies contribute little to ensuring that their customers are properly prepared. Again, the discussion helps users question the sometimes overly romantic image of the Australian outback as mediated by travel media. After all, people die every year because of trying to travel the outback without proper training and equipment. The fact that the Australian outback is dangerous is rarely mentioned in glossy travel shows featuring romantic camp fires and sleeping under the stars though.

4.2 Expansion quality

By expansion we mean that in response to an inquiry, community members may not only provide directly relevant information but also additional information they think would be appreciated. The concept of expansion is related to the concept mediation as discussed in the previous section but does not necessarily relate to user expectations created by advertising and other media. Of course, expansion may lead to the information seeker questioning his or her initial perspective as the information provided may help adjust the information seeker's perspective:

Hypothesis 2: information provided by online communities may exceed what would be directly relevant (in the information retrieval sense) information and may include additional information considered helpful or interesting.

This hypothesis is supported by a conversation triggered by a user inquiring about making a reservation for the ferry to Kangaroo Island, Australia ("Fähre nach Kangaroo Island", posted on australien-info.de on 11-11-05). One of the answers ("Sonderfahrten bei Bedarf auch außerhalb des Fahrplans" also posted on australien-info.de on 11-11-05) is that, based on personal experience, reserving may not be necessary at all. Furthermore the community member providing the information recommends reserving some time for seeing Victor Harbour and Granite Island which was not part of the initial inquiry at all.

This hypothesis is also supported by a conversation triggered by a user inquiring about a hotel near Perth airport ("Hotel in Perth" posted on australien-info.de on 15-11-2005). A community member

knowing Perth and the location of Perth airport interprets the user's situation, concludes that most likely, the tourist is going to stay in Perth for at least a day anyway and recommends to seek a hotel in downtown Perth rather than near the airport (basically equivalent to asking "are you sure you want to stay at the airport?"). Other community members support this suggestion. Responding to the suggestions, the user confirms that they are going to stay longer and thanks the community members for their suggestions.

Another example is a discussion started by an inquiry about beaches and national parks between Brisbane and Sydney ("Route Sydney- Brisbane" posted on australien-info.de on 21-11-2005). Although the initial question explicitly refers to beaches and national parks, one community member recommends visiting a particular market in Eumundi near Brisbane and the town Nimbin. The member also states that they did not like what they saw in Port Macquarie. Last but not least the member states that they found quite a bit of information in guide books that they did not find particularly helpful.

An example from Usenet's de.rec.reisen.misc community is a discussion thread triggered by a question inquiring about the cheapest mode of travel to Marrakesh, Morocco under certain time constraints (see the Usenet posting [<dlt52s\\$fp3\\$1@svr7.m-online.net>](mailto:dlt52s$fp3$1@svr7.m-online.net) and follow-ups for details). In addition to providing a comprehensive answer, the community member also provides information about hotels in the destination city and, based on his own experiences, recommends one of them.

Another de.rec.reisen.misc example is a discussion that initially focuses on using laptops for wireless Internet access in Las Vegas hotels (see Usenet posting [<437d1360\\$0\\$21953\\$9b4e6d93@newsread2.arcor-online.net>](mailto:437d1360$0$21953$9b4e6d93@newsread2.arcor-online.net) and follow-ups for details). Soon the discussion also covers issues such as securing laptops in hotels (see [<437db16e\\$0\\$7429\\$9b4e6d93@newsread4.arcor-online.net>](mailto:437db16e$0$7429$9b4e6d93@newsread4.arcor-online.net) and follow-ups for details).

Last but not least, a response to an inquiry about recommendations for inexpensive family holidays (see Usenet posting [<4382edef\\$0\\$20842\\$9b4e6d93@newsread2.arcor-online.net>](mailto:4382edef$0$20842$9b4e6d93@newsread2.arcor-online.net) and follow-ups for details) does not only recommend destinations. The posting also includes specific hints for saving money when traveling by railway, which triggered a follow-up discussion.

4.3 Immediacy quality

We use the term "immediacy" to denote the provision of information that basically requires being at a certain location at a certain time for sampling (or having sampled) the information requested. The notion typically refers to information about aspects of natural settings featuring rapid and/or unpredictable change rather than built environments. For example, the condition of unsealed remote roads or remote river crossings (no bridge within hundreds of kilometers) during the tropical "wet" season in Australia's Northern Territory can change dramatically (and often unpredictably) within very short periods of time whereas e.g. the opening times of the Museum of Modern Arts in New York City would change (if any) at a much slower pace and in a somewhat predictable way (e.g. different opening times during Summer and Winter). Furthermore the information about the condition of unsealed roads and river crossings may have a significant *immediate* impact on travel routes.

A related issue is that in order to sample the information the person would need to have attended the location not too long ago. Regarding the condition of remote tracks it might be sufficient to find someone who mastered the track a week ago and who can confirm the tropical downpour hasn't started yet. Or, the other way round, someone just managed to cross a river at a certain spot, knowing that this year's wet season is just over and from now on, water levels are dropping (rather than increasing), thus making it easier to cross the river at that location.

Hypothesis 3: Online communities are capable of delivering information whose immediacy can only be accomplished when bypassing guide books and similarly sedate information sources.

Naturally, one would expect to see few postings that relate to the immediacy characteristic but respective answers would be considered particularly valuable as the community may be the only source to gain respective information.

Hypothesis 4: Information meeting the immediacy quality characteristic may be rare but is particularly valuable as the information can hardly be retrieved from other sources.

Support for hypotheses 3 and 4 is provided, for example, by information contributed to a discussion about crossing Australia's Simpson Desert, one of the world's most remote and hostile areas, in a four wheel drive ("Simpson Desert", posted on australien-info.de on 01-11-05). One of the community members actually traveled this area just a few weeks earlier and reported, among other things, that unexpectedly, they were not able to cross the "Big Red" (a particular sand dune considered an attraction among remote travelers) as the peak of the dune turned out to be five meters too high.

The value of such community information becomes apparent when considering that the original inquiry was posted by some of the most regular and most experienced contributors to this particular community. Clearly, it would be extremely difficult to find an alternative source for the kind of information described above (if any). Being able to get this kind of feedback suggests that hardly any information request is too specific to be answered. More importantly, members appear to believe that this community is the place where such questions are likely to be answered.

For the handful of experts directly participating in the "Simpson Desert" discussion, the information hardly triggered what we called mediation of perspective in a previous section (regarding the sometimes overly romantic image of the outback mentioned earlier) as these experts are well aware of the dangers inherent in traveling the outback. However, one of the experts actually reflected upon a story posted by another community member and concluded that he might have to rethink the way he contributes information to some discussions as non-experts might not have the skills to assess his recommendations properly.

5 DISCUSSION

In the previous section we presented four hypotheses regarding specific characteristics of community information. For convenience reasons we repeat them here:

1. Online communities can identify and (re-)mediate a certain state of tourism knowledge.
2. Information provided by online communities may exceed what would be directly relevant (in the information retrieval sense) information and may include additional information considered helpful or interesting.
3. Online communities are capable of delivering information whose immediacy can only be accomplished when bypassing guide books and similarly sedate information sources.
4. Information meeting the immediacy quality characteristic may be rare but is particularly valuable as the information can hardly be retrieved from other sources.

Based on the evidence we provided (even though the evidence is qualitative not quantitative) we believe it is reasonable to conclude that these hypotheses are supported and also justify identifying a set of distinct characteristics, namely notions of mediation, expansion and immediacy, for describing particularly useful community information.

The relationship between the community information characteristics used by Schwabe and Prestipino (2005), drawing on work by Bailey and Pearson (1983) and Rittberger (2000), and the characteristics proposed in this paper is such that we refine some of their characteristics and expand their set of characteristics in other areas. By introducing immediacy and meditation, we expand and refine in

particular the notions of timeliness and personalization, respectively. Receiving an answer to an inquiry within reasonable time is important but it is at least as important how the information is perceived and how it affects the recipient. Similarly, personalization is much stronger if it is not just about specific information but also about information that possibly helps the recipient broaden his or her understanding of the subject area. In this sense it could also be argued that topical adjustments of discussions aimed at supporting information seekers is different from what has been described as topic drift in Usenet discussions (c.f. Osborne 1998).

Another aspect worth discussing is that notion of immediacy we proposed (centered around a notion of location dependence) provides a distinct perspective on the global transformation of economy, society and culture points through the power of networks (e.g., Castells 1996, 2001) which is fueled to some significant extent by the Internet and associated telecommunication networks. It is precisely *location-independence* that has been identified as an important characteristic of the network society, whereas we demonstrate how networks can actually re-introduce *location dependence*.

Last but not least we would like to draw the reader's attention to the notion of relevance which is one of the core concepts in information science and retrieval (e.g., Korfhage 1997). Automated information systems necessarily incorporate some way of calculating relevance when assessing documents in response to a user query. Some of the examples we provided (in particular, the "travel to Marrakesh" discussion thread discussed earlier in the context of the Expansion characteristic) suggest that communities may provide information even if the information is not directly "relevant" (in the information retrieval sense) to the information seeker's query. This means that in such situations, the community's understanding of the information seeker's situation *overrides* any other relevance criteria that might be applied. This kind of relevance as lived-in "everyday experience" (Dirndorfer Anderson 2005) is something that can hardly be supported by fully automated information systems as opposed to communities which are better described as socio-technical systems.

The potential scope of feedback from online communities is also evident from the observation that if it happens that community members are *not* able to answer questions they may often refer the information seeker to friends or other sites likely to provide the information sought. Again, doing so would be extremely difficult to accomplish using a traditional information retrieval approach and their ways of finding and delivering information.

6 CONCLUSIONS AND FUTURE RESEARCH

Research into the quality of online tourism community information suggests that in terms of timeliness, completeness and personalization, online communities may outperform more traditional tourism information sources, in particular guide books. In this paper, we provided some evidence that in terms of relevance and impact, the information provided by online tourism communities often exceeds the notions of quality investigated in this earlier research.

In particular in regards to what we call expansion quality and immediacy quality, it is reasonable to state that communities revolutionize information access in tourism (and also in other areas we haven't discussed in this particular paper).

The above said holds even though most of the information activities above did not show any indication of making use of the full potential of mobile information technology. For example, it appears that the report regarding the Big Red dune in remote Australia was posted only after the community member returned to urban environments. Considering the speed of technological developments and deployments in the area of mobile computing it does not seem unreasonable to assume that in just a few years, the community member might have reported the experience straight from the remote site, just like tourists have started to send camera phone pictures from locations considered remote just a few years ago (Crouch, Jackson and Thompson 2005). As a matter of fact, there is no location in Australia or (most likely) anywhere else in the world from where you could not get Internet connection *in principle*. It's just a matter of technical effort and financial resources.

Work on linking virtual tourism communities and physical locations (see related work section) mainly focuses on the community -> location direction but considering the spread of mobile devices it should be straightforward to establish the above discussed location -> community direction. Regardless of the specific technology used it also seems that the concept of location dependency, backed by suitable location markup languages, as a distinct dimension in knowledge management might deserve more attention in regards to managing and disseminating tourism information.

Walden et al (2004) discussed mobile challenges for travel and tourism, in particular the expectation that travelers' and tourists' lives will be enhanced by smart services, accessible via mobile devices anywhere and anytime. Considering Rheingold's (2003) investigation of truly revolutionary Smart Mobs, what we are seeing until now might be just a tiny first step in a tidal wave of change to come in information access.

A limitation of the research presented in this paper is the limited time frame during which data had been collected. Apart from scanning online communities to collect more data to support the findings presented in this paper, our future research in this area pursues two complementary directions. First, we are exploring ways to provide web-based tools and services to online communities that help their members "markup" their contributions such that they are easier to retrieve and process. Similar to hypertext markup languages, such as the web's HTML, such a tourism/location markup language would help identify locations (or, more generally, points of interest) and information associated with them. Such information would also enable linking community contributions to advanced web-based services such as GeoCode (www.geocode.com) and Google Maps (maps.google.com).

Second, we are investigating ways to introduce route descriptions as a community-authored resource (see eg Lueg and Bidwell 2004). This means tourists and also participating institutions may provide and also retrieve from special web sites route descriptions related to their particular interests. Using such descriptions it would be possible to further expand the idea of having travelers follow dynamically created tours as proposed by Davis et al. (2002). Their idea was to re-use automatically collected movement data while device-carrying travelers explore an area. The data could then be used to define "most popular tours" or "tours enjoyed by famous people". Based on the user's current location and the desired destination, route description options would include the shortest route, the most scenic route (perhaps considering the time of the day, sunsets etc.) and routes passing along other attractions. In the case of route descriptions provided by businesses, routes might pass along business alliance partners that might be of interest. The brokering approach proposed in this paper would allow community members to propose specific tours based on their knowledge, interests and past experiences.

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