

CHAPTER II

LITERATURE REVIEW

Nature Tourism and Cyberspace

Definitions

Nature tourism

The Texas State Task Force on Nature Tourism (STFTNT 1994, 3) defined nature tourism as: “. . . discretionary travel to natural areas that conserves the environmental, social and cultural values while generating an economic benefit to the local community.” The definition of outdoor activities such as nature tourism and other forms of outdoor recreational tourism have become more complex over time. It is not the intent of this research to contribute to this discussion; however, it is important to clarify some of these definitions and then explain the position of this research.

Until the early 1990's *ecotourism* was the term that was most utilized to describe travel for the purpose of enjoying nature. Since then the term *ecotourism* has become more specialized to describe a specific type of tourism that is no-impact (or low impact). The International Ecotourism Society defines ecotourism as “. . . responsible travel to natural areas that conserves the environment and sustains the well-being of local people” (TIES 1993, n.p.). Although ecotourism was likely coined prior to nature tourism it is “. . . sometimes defined as a sub-category of sustainable tourism or a segment of the larger nature tourism market” (TIES n.d., n.p.). For this research the terms

“nature tourism,” “nature-based tourism,” “ecotourism,” “ranch tourism,” “farm tourism,” and “agritourism” will be used to identify nature tourism Web sites.

Cyberspace

Cyberspace is the term that was coined by William Gibson (1984), a science fiction writer who first used the word in his novel *Neuromancer*. In *Neuromancer* cyberspace is depicted as a “dataspace,” an expansive world in the wires (Shields 1996) where trade is conducted via information on the matrix, “. . . a visual, Cartesian and electronic space” (Kitchin 1998, 385). Gibson (1984) describes cyberspace as a network space that is connected and accessed through a vast network of computers giving access to massive data stores. “Gibson’s cyberspace is a place where the imagination flourishes interacting with data on the matrix which take on colorful architectural forms” (Kitchin 1998, 385). “Today cyberspace describes the whole range of information resources available through computer networks” (Enzer 1999 n.p.).

Cyberspace is a metaphor that describes the geographic nature of the Web. Many authors have recognized that the Web is bringing about a “new space,” or, as Shields (1996, 1) suggests, “. . . a new network of virtual sites . . . superimposed on the world of places.” One effect of cyberspace is the creation of a new social “space” (Morely and Robins 1995). This new space is a place where people can meet and interact, a place that is uncharted and has a “virtual geography” that bears little resemblance to geography outside the wires (Batty 1997, 337). In fact, geographers are recognizing the potential geographical implications of the Web. There is a growing literature on the topic (Squire 1996; Batty 1997; Graham and Aurigi 1997; Kitchin 1998; Graham 1998, Donert 2000, Valentine and Holloway 2000, Zook 2000). A large portion of research attempts to

delineate or measure the extent of the Web and its impacts. Other researchers are examining *place* in cyberspace (Benedikt 1991; Batty 1997; Tanney 1997; Adams 1997; Barlow n.d.). However, overall, the literature on cyberspace is “. . . confused, anarchic, ill-formed and rapidly evolving” (Batty 1997, 351).

Internet

“The vast collection of inter-connected networks that all use the TCP/IP protocols and that evolved from the *ARPANET* of the late 60’s and early 70’s” (Enzer 1999, n. p.).

World Wide Web (the Web)

Enzer (1999, n. p.) defines the Web as:

Frequently used (incorrectly) when referring to "The Internet," the Web has two major meanings - First, loosely used: the whole constellation of resources that can be accessed using *Gopher*, *FTP*, *HTTP*, *telnet*, *USENET*, *WAIS* and some other tools. Second, the universe of hypertext servers (*HTTP servers*) which are the servers that allow text, graphics, sound files, etc. to be mixed together.

This research was conducted about nature tourism resources on the Web. Thus, in the context of this research I used the term the *Web*. However, much of the research found for the literature review has been conducted about the Internet, as a result there are many references to the *Internet* in this research. For the context of this research the two terms are interchangeable.

Web page

“A document on the World Wide Web. Every Web page is identified by a unique URL (Uniform Resource Locator)” (Internet.com n.d., n.p.).

Web site

Internet.com (n.d., n.p.) defines a Web site as:

A site (location) on the World Wide Web. Each Web site contains a home page, which is the first document users see when they enter the site. The site might also contain additional documents and files. Each site is owned and managed by an individual, company or organization.

This research was conducted by surveying organizations/institutions/individuals that have developed nature tourism Web sites.

Internet Service Providers (ISP)

Internet.com (n.p., n.d.) defines ISP to be:

. . . where Web sites are located or published on the Web. Short for Internet Service Provider, a company that provides access to the Internet. For a monthly fee, the service provider gives you a software package, username, password and access phone number .

Internet content business (ICB) and Internet content sponsor (ICS)

One question in this research related to the motivations of the people or organizations that have developed Web sites. The term for these people does not exist in the literature. *Web site “Sponsors”* would seem to be a logical term for the entities interested in having a Web site produced; however, “*Sponsor*” is commonly used on the Web for the companies that are providing some sort of financial support for a Web site in return for some form of advertising (e.g. banner ads). Zook (2000) used the term

"Internet content business" (ICB) while investigating the proliferation of *.coms* (for example yahoo.com or wired.com) and their geographical locations. Zook (2000, 412) defined ICB as "... businesses involved in the creation, organization and dissemination of informational products to a global marketplace where a significant portion of the business is conducted via the Internet." This definition is useful for this research because it provides a benchmark. However, it did not provide an accurate definition for the actual individuals or organizations that have a Web site. Also, the organizations/individuals that have developed nature tourism Web sites might not fit the definition under the criteria established by Zook (2000, 412) specifically in regards to "... a significant portion of the business is conducted via the Internet." This research designated the term *Internet content business* (ICB) as those businesses that provide services to "publish" the Web sites. *Internet content sponsor* (ICS) was defined as the organization/individual providing the *impetus* for the development of a Web site. In other words, an ICS is the *actual* nature tourism business or organization. In some cases these two entities were the same.

Death of Geography or Geography Still Matters

Will the Internet be the end of geography? This question has been approached by a number of authors (Harvey 1989; Benedikt 1991; Castells 1996; Gorman 1998; Graham 1998; Kitchin 1998). There are two contested positions about how cyberspace affects geography (Kitchin 1998). Some authors suggest that the importance of geography is being lost because the Internet causes the "death of distance." Others believe that cyberspace is a new frontier for geographers to investigate, therefore, geography still matters (Kitchin 1998).

Death of geography

Harvey (1989) argued that information technologies compress space and time and cause a collapse of spatial and temporal boundaries. He supports his position by comparing earlier innovations such as the railway that reduced communication times to telecommunications that allows communications to be nearly instantaneous (Harvey 1989). The same can be said about the communication capabilities of the Web (Mitchell 1995, Negroponte 1995).

The perception of the collapse of “space-time relations” and the development of new “spaceless,” “placeless” social spaces have led some authors to question the “. . . significance of geographical location at all scales” (e.g. Benedict 1991). For Benedikt (1991, 10), “. . . we are turned into nomads . . . who are always in touch with the spatial dynamics of the whole world collaps[ing] to those of a pinhead.” To Robins and Hepworth (1988), geography and time are no longer boundaries. Mitchell (1995, 8-9) suggests:

Cyberspace is profoundly *antispatial* . . . You cannot say where it is or describe its memorable shape and proportions or tell a stranger how to get there. But you can find things in it without knowing where they are. The Net is ambient – nowhere in particular but everywhere at once. You do not go *to* it; you log *in* from wherever you physically happen to be . . . the Net’s despatialization of interaction destroys the geocode’s key.

Geography still matters – a new geographic frontier

The majority of geographers conducting research about the Internet argue that new geographical spaces are emerging in *cyberspace* (Adams 1997; Adams and Warf 1997; Kitchin 1997; Graham 1997; Graham 1998; Kitchin 1998; Zook 2000). Barlow (1998, 6) comments that, “. . . unlike previous frontiers, there is no end to this one.”

McGuire (1996, 1) argues that “. . . cyberspace has a definite geography, albeit one not in the traditional sense of the term . . . [it] contains thousands of “virtual communities” which stake out their own territory.”

Kitchin (1998) believes that geographers are especially well equipped with their emphasis on space, spatiality, and place to make contributions to the study of cyberspace. He states that “. . . the widespread adoption of cyberspatial technologies raises fundamental questions concerning the role of space and place in contemporary society and culture” (Kitchin 1998, 399). Geographical perspectives are certainly crucial if, as Castells (1988) suggests, a shift is occurring from a “. . . space of places [to a] space of flows,” or as others suggest that cyberspace is transforming geopolitical relations which results in a diminishment of nation-states and place-based politics (Thu Nguyen and Alexander 1996).

Kitchin (1998, 386) explains why geographic analysis of the Internet is important.

First, cyberspatial communication is seen to be challenging both our traditional ideas concerning mass communication and forms of communication (combining words, images and sound into a metamedia). Secondly, some analysts suggest cyberspatial interaction blurs modernistic dualisms, such as virtuality with reality and technology with nature, thus illustrating the dawning of the new postmodern era. Thirdly, and for geographers most importantly, it is argued that cyberspace is transforming space-time relations and creating new social spaces that lack the formal qualities of geographic spaces.

There are three reasons why space and time, and thus geography, remain significant (Kitchin 1998). First, the process by which globalization occurs is not uniformly distributed between “developed” and “undeveloped” countries. This is a result of both cyberspatial connections and bandwidth (how fast a communication connection is) not being distributed equally both within and between western countries, and in

comparison to developing countries. This process is occurring primarily because “. . . globalization is not an egalitarian process aimed at creating an equitable distribution, it is designed to reproduce capital most effectively” (Kitchin 1998, 387). Secondly, even though information on the Internet seems geographically dislocated, it often is most useful in the locale within which the body resides. A corporation producing unique Web sites for various localities in order to appeal to differences in community preferences provides evidence to support this point (Nel et al. 1999). Thirdly, cyberspace exists in the real world that has a “spatial fixity.” This point refers to the physical infrastructure in wires and hardware, and points of access that exist in order for the network to function. There is a world outside the wires in the form of other infrastructures. Thus, local and global markets, and location, do not become irrelevant – cyberspace does not annihilate all the other determinates of access to material and markets (Kitchin 1998).

Globalization has a dual effect on places, simultaneously exerting the contradictory pressures of unity and fragmentation (Griswold, 1994). In actuality these new cyberspatial technologies act as a catalyst and permit the exploitation of various places thus helping to capitalize on cheap wages, reduced standards of work, cheap sites, etc. (Kitchin 1998). These simultaneous pressures would then seem to escalate geography’s role to investigate these changes.

Castells (1996) argues that geography remains paramount. Kitchin (1998) and Zook (2000) point out that cyberspatial technologies reinforce the centralization trends towards large metropolitan areas since they are dependent on the support infrastructure and social milieu that exist there. Others suggest that information technologies have decentralizing effects (Castells 1996). In any case, these contradictions bring up more

questions that require further investigation. There appears to be a delineation of two distinct forms of space: a “space of forms“ and a “space of flows” (Castells 1996). This “space of flows” overlies and is beginning to dominate the old “space of places” (Castells 1996). Thus, as Tomas (1991) suggests, real space is merely being overlain by a virtual space in a symbiotic fashion that enhances an organization’s ability to be more flexible in real-space geographies. “The relationship between cyberspace and space is important and there is a real need to understand, map and deconstruct the complex spatiality of cyberspace” (Kitchin 1998, 387).

Squire (1996, 101) recognizes that the integrative aspects of geography put it in a position to explain the “. . . dynamics (and dialectics) of evolving electronic landscapes” both theoretically and through empirical perspectives. In cyberspace the traditional geographic boundaries are collapsed and/or redefined (Squire 1996, 103).

. . . emerging cyberspaces present places and relationships well suited to many kinds of geographic scrutiny . . . Today, the Internet suggests a new spatial frontier. Thus, conjoining theories and methods of contemporary social and cultural inquiries, electronic spaces should challenge geographers particularly to forge new understandings of ways of seeing and of being in multi-faceted worlds (Squire 1996, 103).

Research about the Internet and cyberspace is truly a frontier (Squire 1996). This new frontier has created a new discipline called cybergeography, or virtual geography.

Cybergeography

Cybergeography is concerned with the range of cyberspatial, geographical phenomena and the impact of these new information technologies on the real world (Donert 2000). It studies a broad spectrum of topics from the study of the infrastructure, traffic flows, and the demographics of the new cyberspace communities, to the perception (Porter 1997) and visualization of these new digital spaces (Adams 1997).

Chandler (1998) suggests that cybergeography is about defining space, the use of space, and the impacts of space. It is about the ways that people interact with the freedom that cyberspace provides and the communities that exist there. Donert (2000) describes cybergeography as the study of how virtual places impact people's lives in the real world. The impacts of virtual places has yet to be fully understood: however, as business and commerce begins to grasp the impact of the "information society," it is likely to "... transform the geography of place and space as we understand it today" (Donert 2000, 37).

Virtual geography

Batty (1997, 4) defines virtual geography as the "... study of place as ethereal space and its processes inside computers, and the ways in which this space inside computers is changing material place outside computers." He provides an overview of the terms that have been used in "virtual geography" to describe the spaces and places that are evolving in the digital world. "Many facets of geography are becoming virtual" (Batty 1997, 2).

- Place/space: the original domain of geography abstracting place into space using traditional methods

- Cspace: abstraction of space into c(omputer)space, inside computers and their networks
- Cyberspace: new spaces which emerge from cspace through using computers to communicate
- Cyberplace: the impact of the infrastructure of cyberspace on the infrastructure of traditional place (Batty 1997, 2).

Computers originally generated cspace. However, it wasn't until computers and communications combined that cyberspace evolved creating new geographical spaces within the ether (Batty 1997). Batty (1997, 5) describes the evolution of cyberspace noting that computer technologies affect the world in the way:

. . . we organize our infrastructure and our geography of real places, as the new material infrastructure of telecommunications and computers itself replaces their non-digital equivalents, thus providing an extended medium for cyberspace . . .

There are differences between cyberspace and cyberplace. Cyberplaces can map to a one-to-one relation onto real places, cyberspace cannot. Cyberspace, however, is not “. . . necessarily imagined space—it is real enough in that it is the space set up by those who use remote computers to communicate” (Batty 1997, 8).

Previous Geographic Research About the Internet

Some of the research about the Internet attempts to measure and analyze the spatial patterns of its distribution (e.g. Staple 1993; Staple 1995; Curry 1996; Larsen 1996; Dodge 1998; O'Connell 1999; Donert 2000; Koppell 2000; Taylor 2000). Three main aspects of the Internet are the focus of existing research: Internet traffic and users, the amount of available information, and the performance of the Internet in carrying that information (Claffy 2000).

Measuring the Internet's diffusion and development is extremely difficult because it is growing so rapidly and without a central control (Ciolek 1997). As of November 2000 it was estimated that the global online population had reached 401 million, about 6.7 percent of the estimated total world population (NUA 2000). In November 2000, North America had an estimated 153.84 million users, about 38 percent of the global online population (NUA 2000).

Many people have attempted to visualize the spatial patterns of various aspects of the Internet (e. g. Evans 1995; Giardin 1995; Carriere and Kazman 1997). Zook (2000) conducted research to characterize the distribution of the Internet businesses. He hypothesized that the location of Web sites (Internet content production) would be associated with the availability of the technology to support those Web sites. What he found instead was the sites were more likely located near "information intensive" industries. His research used the registration addresses for the .com domain names. This would assume that the Web site server was located in the proximity of the business that authorized the Web site. Although it is a practical way of researching the topic given the extent of the Web, a question arises as to whether the assumption about the location of the sponsoring business and the Web site server is accurate.

The findings from research evaluating Internet Service Providers (ISPs) (Greenstein 1998; Zook 2000) show that, geographically, the commercialization of the Internet is mostly associated with urban centers. This finding is reasonable because ISPs would be expected in greater concentration in areas with larger population. This research investigated the commercialization and proliferation of Internet technology in rural areas.

This is because, in the main, nature tourism is a rural phenomenon. Most nature tourism experiences require natural resource settings that are mainly found in rural areas.

Geographers examining cyberspace have also focused on the evolving information technology and its effect on urban-regional development. This topic is important because historically cities developed as a way to overcome space constraints and ease communication (Kitchin 1998). However, the growth of telecommunication technologies and the improvement of communications through space and time nullify this process to some extent (Graham and Marvin 1996). Some authors suggest that this will lead to a “. . . dematerialization of the city.” However, there is little evidence that this is happening (Kitchin 1998). In contrast, it appears that these new technologies are actually reinforcing city life and urban centers. Rather than disintegrating cities, these new technologies are reorganizing and altering patterns of urban development and changing relationships between cities and between cities and their surrounding regions. (Graham and Marvin 1996; Zook 2000).

Urban geographical research has implications on the development of nature tourism on the Internet. This is because questions about urban/rural development are a major concern in the U.S. and rural development is significantly affected by nature tourism. The findings of this research should provide some clarification of the urban-rural distribution of nature tourism businesses that have an Internet presence.

Previous research by Zook (2000) had a similar motivation to part of this research, to investigate the geographical characteristics of Internet Content Businesses. One of Zook's (2000, 412) assumptions is that the registration address based on the collected domain names “. . . corresponds to the location of the site where content

creation is taking place.” However, he also admits that, “. . . it is entirely possible that a firm decides to host its content on a server farm located hundreds or thousands of miles from where it is designed and created” (Zook 2000, 412).” Zook (2000) examined the proliferation of the Internet as a whole in the United States by conducting an aggregate analysis of ICBs based on the registration addresses of Internet domain names.

This research provides more insights into the nature of ICBs by determining more definitively the actual geography of the Internet content businesses (ICBs) and the Internet content sponsors (ICSs) for nature tourism businesses/organizations. The methods employed in this research provided the geographical location of both ICSs and the ICBs. It lead to a clarification of Zook’s assumptions about Internet Web site registration addresses, at least in regard to nature tourism activities on the Internet.

Other Related Research About the Internet

Feher and Towell (1997) conducted research with an approach similar to part of this research. A survey of 500 companies was conducted to analyze the impact and use of the Internet in business settings. The most significant findings from this research are:

The majority [of businesses] indicated that the Internet is not yet secure enough for corporate communications of electronic commerce. Over half noted that Internet use was particularly viable in their industry: 73 percent felt the importance of the Internet in their organization was growing, but only 55 percent felt that they would realize any significant business value from Internet use (Feher and Towell 1997, 196).

The results of the survey suggest that the use of the Internet by businesses is immature. Responsibilities resulting from Internet connections have not been formalized in these firms. Access to the Internet was provided to less than 25 percent of their

employees. Most business managers surveyed in this research believed that their customers and vendors are not yet on-line even though 85 percent of the firms surveyed were using the Internet in some fashion (Feher and Towell 1997). Finally, these authors suggest that information technology managers still struggle to evaluate the contributions of this new technology in their organizations (Feher and Towell 1997).

Research on Tourism and the Internet

“And how might Internet activities create new geographies of leisure, recreation and tourism” (Squire 1996, 103)? Batty (1997) recognizes the challenge of charting the limits of cyberspace and suggests that its activities should be identified. All human interactions have the potential to be represented in cyberspace including production and consumption in both work and leisure. Profiling cyberspace requires diverse considerations because these and other generic activities such as communication, learning, simulation and decision are being influenced by digital interactions (Batty 1997). Batty (1997, 9) sees that the Web is dominated by those sites where visitors participate in “. . . low level consumption for leisure . . . where tourist-type information and interactive navigation around various data portrayed as real space, product space, learning space and so on constitute the message.” Although these routine activities represent the simplest way of engaging in cyberspace, investigating them can provide insights into its nature because these activities are what ultimately enrich cyberspace’s character (Batty 1997). Graham (1998, 173) observes that:

. . . any cursory examination of the Internet and World Wide Web shows that much of the traffic actually *represents and articulates* real place and spaces, supporting and generating physical mobility, tourism, transport

and trips for the highly mobile, elite groups that currently use it in the process.

And when new electronic networks are “retrofitted” over the older physical transport systems, they can “. . . enhance the efficiency, capacity and attractiveness of these networks (Graham and Marvin 1997, 263). As Graham (1998, 173) suggests “. . . the extending and intensifying grids of travel, trade and tourism actually rely on the enhanced control and co-ordination capacities of IT at every stage and scale.”

Evolving Theory on the Implications of Information Technologies to Geography

There is little applicable theory available for understanding activities in cyberspace. Graham (1998, 165) described three dominant perspectives regarding information technology and society, and how space and place are conceptualized: (1) “substitution and transcendence (dominated by technological Utopianists),” (2) the “co-evolution perspective (drawing from political economy and cultural studies),” and (3) the “recombination perspective (derived from recent work in actor-network theory)” (Graham 1998). The substitution and transcendence perspective has a major weakness in that it considers the whole of human communications as the transfer of information and coordination of human activities (Graham 1998). Consequently, I used the last two perspectives as the conceptual and theoretical basis for this research. I believe a combination of these viewpoints provides valuable insights into understanding the Web and its impacts on society. In the following sections I describe the co-evolutionary perspective and the recombination perspective: actor-network theory. Then I demonstrate how they relate to the research problem.

Co-evolutionary Perspective

The co-evolutionary perspective suggests that there is a co-evolutionary process occurring between place-based and telemediated exchanges (Graham 1998). This perspective purports that there are complex articulations occurring between geographical spaces and places. Unlike the substitution and transcendence perspective, it recognizes that there is a communal aspect to human communications that cannot be simplified to the transfer of information and coordination of human activities (Graham 1998). These exchanges do not replace place-based worlds. Instead they embody complex global-local articulations between the “space of places” and the “space of flows” (Castells 1996). The co-evolutionary perspective suggests that the production of material spaces interacts and evolves with the production of electronic networks and “spaces,” and exists in the same broad societal trends and social processes (Mosco 1996). This perspective notes that these new electronic realms created through new technologies produce complex interactions with geographical space and place. For example, the presence of nature tourism Web sites that intend to promote *places* represents the interaction of real material places and electronic spaces.

This perspective has arisen in the literature about telecommunications in cities and is further supported by the theoretical perspectives drawing on critical political economy (Graham 1998). Kirsch (1995) supports this alternative perspective and criticizes the use of overly simplistic metaphors that are commonly used to describe technology’s affects on space and time. He opposes simplistic terms like “global village” and “space time compression” and suggests they overlook the complex relationships

“ . . . between capital, technology, and space, through which space is not shrinking but rather must be continually recast” (1995, 544). Questioning the idea of a shrinking world, Kirsch (1995, 545) suggests that technology does not simply annihilate space by reducing communication times, but instead facilitates the “ . . . production of new kinds of space.” In addition, there is an intimate relationship between technological development and society because when “ . . . technology is socially constructed, society is [also] in part technologically constructed” (Kirsch 1995, 445).

Although new information technologies allow greater flexibility in how businesses, tourists, and investors operate in space, the new technologies do not provide absolute mobility. “Time and space barriers become reconstituted and reformed within global geometries of flow, incorporation and exclusion” (Graham 1998, 175). Ferguson (1992, 79) further emphasizes this point, and states

. . . mobility of commerce, organizations, information and people does not make time and space irrelevant, rather, it highlights the extent to which these areas of experience have become more, not less, multilayered, interrelated, and complex.

As Graham (1998, 174) suggests, new information technologies “ . . . actually resonate with and are bound up in the active construction of space and place, rather than making it somehow redundant.” This co-evolutionary perspective is valuable because telecommunications networks have a history that goes back to the telegraph and the telephone. These historical examples provide a benchmark for understanding how new communications technologies and material places are in a “ . . . state of recursive interaction” and that each shapes the other (Thrift 1996 as cited in Graham 1998, 174). Staple (1993) examined the complex interactions between global and local dynamics of

both material places and electronic spaces. He suggests that the Internet is having a dual effect. It both compresses time and space barriers while at the same time it supports a fragmentation process at the local level. Instead of promoting a single cyberspace, the Internet creates a spatial realm that is resulting in a “. . . geographical explosion of place” (Staple 1993, 52).

The usefulness of the co-evolutionary perspective, as stated by Graham (1998, 174), is that “. . . it underlines the fact that materially constructed urban places and telecommunications networks stand in a state of recursive interaction, shaping each other in complex ways.” However, methodologically, this perspective has a major weakness in that it does not provide operational tools to conduct analysis.

Recombination Perspective: Actor-network Theory

The final, and perhaps the more practical perspective, is the “recombination: actor-network theory.” It utilizes the actor-network theory of Callon (1986a; 1986b; 1991) and Latour (1993). This perspective views cyberspace as not one entity but rather a combination of many components. It consists of “. . . multiple, heterogeneous networks, within which telecommunications and information technologies become closely enrolled with human actors, and with other technologies, into systems of sociotechnical relations across space” (Graham 1998, 178). Thus, cyberspace needs to be examined as a “. . . fragmented, divided and contested multiplicity of heterogeneous infrastructures and actor-networks” (Graham 1998, 178).

Actor-network theory was initiated by Latour (1987; 1992a; 1992b; 1993) and Callon (1986; 1991) in the field of social studies of the history of science and technology.

“An actor-network, then, is the act linked together with all of its influencing factors (which again are linked), producing a network” (Hanseth and Monteiro 1998, n.p.).

Actor-network theory is concerned with “. . . how decisions are made about what is known” (van House n.d., n.p.). According to actor-network theory, how people do things is affected by many interrelated factors, both technical and non-technical. These factors link together and construct a heterogeneous network (Hanseth and Monteiro 1998). The network not only consists of actors, but also of other entities (Hanseth and Monteiro 1998). Actors are “. . . entities that do things” (Latour 1992a, 241). The term network is defined as a “. . . group of unspecified relationships among entities of which the nature itself is undetermined” (Callon 1993, 263). Networks consist of a number of actors that have different possibilities to influence other members in the same network. The power of an actor depends on the position within the network. There is no structural difference between large and small actors, between a major institution or a single individual or even a thing (Latour 1992).

The intended product of the networks can be *nature* in form of scientific facts (Latour and Woolgar 1986; Latour 1987), or *technology* (Bijker 1994; Law and Callon 1992; Latour 1991), or *society* (Woolgar 1991). Actor-network theory assumes the indeterminacy of the actor. Neither the actor's size nor its psychological make-up nor the motivations behind its actions are predetermined (Callon 1986; 1991).

Latour (1993) attempts to transcend modernism and postmodernism's dualism between subject and object, nature and society. Modernism and postmodernism explain knowledge and artifacts either by society (social constructionisms) or by nature (realism) (Miettinen 1997). According to Latour (1992b, 281),

“ . . . instead of being opposite causes of our knowledge, the two poles are a single consequence of a common practice that is now the single focus of our analysis. Society (or Subject, or Mind or Brain . . .) cannot be used to explain the practice of science, since both are results of the science and technology making.”

Following Latour, Miettinen (1997) believes that the significance of the concrete network of actors, instead of interrelationships between macro- and micro-phenomena, should be taken seriously into account.

Methodologically, one of the major approaches of actor-network theory is to follow the actors (Latour 1991). This means not only to look at what they do, but also to be focus on what interests them.

Actor-network theory emphasizes the roles of non-human actors. It can be seen as a systematic way to bring out the non-human components that are often overlooked in accounts of scientific and technological achievements. With this theory, technology receives exactly the same explanatory status as human actors. The distinction between human and non-human actors is systematically removed. Actor-network theory considers that technical artifacts in practice play the same role as human actors (Hanseth and Monteiro 1998). However, one weakness of this theory is how to define the boundary of a network. Where does one network end and the next one begin? It seems that the question of how to limit the analysis can only be addressed on an empirical basis.

For this research the co-evolutionary perspective and the actor-network theory provided a valuable theoretical and conceptual framework for examining nature tourism on the Web. The presence of nature tourism Web sites represents the interaction of real material places and electronic spaces that is the focus of the co-evolutionary perspective. In addition, nature tourism on the Web represents a heterogeneous network of human and

non-human actors, such as local communities, natural attractions, governmental policies, and the availability of technologies that support the production of virtual places in cyberspace. Therefore the recombination perspective provided a theoretical basis for conducting an examination, while actor-network theory provided a more functional way to conduct the analysis of nature tourism in cyberspace. As identified by Latour and Callon, this research was conducted by following the “actors” (the nature tourism Internet Content Sponsors (ICSs)) in the “network” (the World Wide Web).