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The Internet Highway and Religious Communities: Mapping and Contesting Spaces in Religion-Online

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We examine "religion-online," an underrepresented area of research in new media, communication, and geography, with a multilevel study of the online representation and (re)presentation of Protestant Christian organizations in Singapore, which has one of the highest Internet penetration rates in the world and also believers affiliated with all the major world religions. We first critically discuss and empirically examine how online technologies are employed for religious community building in novel and diverse ways. Then we investigate the role religious leaders play through their mental representations of the spatial practices and scales through which their religious communities are imagined and practiced online. We show how churches use the multimodality of the Internet to assemble multiple forms of visible data and maps to extend geographic sensibilities of sacred space and create new social practices of communication.

> In cyberspace, pastors and priests, rabbis and imams diligently strive to translate or interpret the historic messages of their tradition into virtual geography and digital sacred time. (Brasher, 2001, p. 70)

In many faith traditions, place holds both functional and theological significance, and neighborhood worship houses are associated with sacred spaces. Historically, an important mission of world religions has been to organize and extend their ministries geographically. More recently, however, the increasing mediation of some religious practices and experiences online not only challenges the assumptions of access, spatial reach, and responsibilities of religious organizations, but also raises new questions regarding what membership and community mean in neighborhood houses of worship.

To participate meaningfully in contemporary "information society," faith-based organizations are faced with pressures and challenges related to the adoption of information and communication technology (ICT) (Cukier &

Middleton, 2003). Although ties to universalistic world religions exist, local parishes are traditionally understood to be critical fields of service, mission, and influence. Consequently, while online religious information and practices embedded within the global space of flows can inform local congregants, they may also pose tensions within dominant organizational and leadership structures in established religious institutions. For geographers and practitioners who are using geographic information systems (GIS) to understand the characteristics of sacred places to map community assets for public participation, religion-online supported by spatial multimedia raises various questions for the use and social implications of GIS. In spite of the recent revitalization of interests to promote religion as a galvanizing force for community regeneration and social cohesion instead of conflict (Furbey & Macey, 2005), we note that researchers from the social sciences, including fields of communication and information studies and geography, have neglected the study of religion in their disciplines (e.g., Campbell, 2005; Dawson & Larson, 2004; Kong, 2001).

Our article aims to fill gaps in the study of religious landscapes based on the experience in Singapore (Goh, 2006), which not only has one of the highest Internet penetration rates in the world but is also a highly religious country, with 85% of Singaporeans reporting affiliation with one of the main religious traditions, including Buddhism, Christianity, Islam, Hinduism, and traditional Chinese religions (Internet World Statistics, 2007, Singapore Department of Statistics, 2000). Following Sui and Goodchild's (2001) call to reconceptualize GIS as media, we show that an examination of religious organizations and their communities online can shed light on the social implications of GIS. Specifically, this article has two goals. First, it critically discusses and empirically examines "religion-online" in order to understand how online technologies are employed for religious community building in novel and diverse ways. The article draws attention to the representation and (re)presentation of religious information online, given that different meanings of real, virtual, and imagined geographies intertwine in contemporary information societies (Sheppard, 1995; Sheppard et al., 1999). Second, in keeping with that understanding that religion-online constitutes a sociotechnical environment where power is negotiated (Chivallon, 2001), we investigate the role that religious leaders play through their mental representations of the spatial practices and scales through which their religious communities are imagined (Anderson, 1983) and practiced online.

In the following sections, we first discuss and then examine how religious organizations assemble their websites and exploit new media. Next, drawing from personal interviews with 20 religious leaders, we show how pastors conceive and co-construct their virtual geographies. Finally, we conclude with a discussion on the contributions of this study to the research on the societal aspects of GIS.

UNDERSTANDING AND REPRESENTING "RELIGION-ONLINE"

Religious organizations have historically depended on some form of media, as local houses of worship operate in a "multimedia" environment with pulpits, tapestries, and stained-glass windows (Schement & Stephenson, 1996). In recent years, however, some organizations have extended their geographic presence by posting religious information and relocating some of their religious practices online. Religion in society has traditionally served doctrinal interpretative and communal integrative functions (Berger, 1967; Durkheim, 1947). However, the means and spaces whereby these functions are accomplished are changing in light of the emergent virtual "sanctuary" sites housing online teachings and ritualistic practices.

According to Dawson and Cowan's (2004) review of research on the Internet and religion, the initial phase of research focused on either the utopian celebration of faith communities utilizing the Internet to revive religious traditions and start new age religious practices, or the dystopic proclamation that Internet will destroy established religion as people build virtual communities separate from physical religious institutions. Now, the contemporary zeitgeist of incorporating the Internet into everyday life has prompted research into how individuals and communities are dovetailing the Internet into their daily local and transnational lives (Haythornwaite & Wellman, 2002). In the case of religion, this represents a revitalized attention to "religion-online" as opposed to "online religion" where the former reflects an "organized attempt," the "one-to-many communication" by religious organizations to provide information about and/or services related to religious groups and traditions (Helland, 2000, p. 207), while the latter refers to the interpersonal religious interaction with others on the Web. In light of new technologies and new media practices in peoples' everyday lives, we are interested in examining a broadened conceptualization of "religion-online." This view includes how religious leaders may harness the Internet to create not only one-to-many broadcasts but also incorporate social networking platforms and an array of other Web-enabled, interactive, and GIS applications for many-to-many communication to fulfill their organizational functions and community missions.

Given that organized religion is one of the most dominant forms of religions in contemporary society (Beyer, 2003), the rise of "religion-online" constitutes new sacred geographies of the information age. According to Coucelis and Getis (2000), cyberspace may be conceived

as "proximal spaces," bridging locational and attribute characteristics of site, on the one hand, and spatial relations associated with situations of interaction, on the other (p. 17). For religious organizations, emerging geographies constituted from both real and virtual spaces raise critical questions regarding the changing spatial relations and practices in neighborhood houses of worship, with implications for GIS representation and use. Conventionally, religious organizations have been mapped as a community asset, as they are popularly perceived to exemplify the best forms of social capital (Putnam, 2001). A few religious ministries are also using GIS to support their work. For example, the Christian ministry Global Mapping International uses the Global Ministry Mapping System for Arcview software to track ratios of churches to population in each neighborhood, to identify locations and responses to literature distribution, to map project locations, and the like (http://www.gmi.org, accessed 10/15/2007). However, religious organizations are also negotiating new forms of bonding and bridging social capital, given local and transnational flows of religious information, goods and services, under current conditions of intensified globalization, especially in major world cities (Cheong & Poon, 2008). Consequently, ICTs may facilitate changes in notions of place through the reconfiguration of how religious information is assembled and communicated online. Such changes reflect the multimodality of the Internet as new media facilitates representation, communication, and expression through use of the digital, multimedia, and networked computers. Thus, Rusted (2004) observes that new media not only convert objects and texts into numerical or digital codes but also allow users to engage in spatial encounters virtually.

For geographers, the Internet further reinforces the importance of the visual as a methodology for understanding and analyzing what Wagner (2006) has termed "visible data" in new ways. Visible data have predominantly assumed the form of numbers in GIS analysis (Schuurman, 2000), but in digital environments, texts, photographs, video clips, and audiovisuals are also becoming popular artifacts or instruments that not only provide new channels of online communication but also transmit geographical information and data that can often times be coded, transcribed, and catalogued.

The relevance of the visual is further underscored both in works on analytical interactivity as demonstrated by Gahegan et al. (2002) and in critical geographers' more socially situated representations (Kwan, 2004). Furthermore, recent research attempts to map virtual geographies have visualized individual activities in both physical and virtual space, for example, using a multiscale GIS environment to portray three different spatial ranges

of physical and telepresence (Kwan, 2001) and the creation of a spatiotemporal GIS design to identify different patterns of human interaction on space–time paths (Yu, 2006). Overall, geographers increasingly note the role of new forms of visible data in building situated spatial knowledge. Sheppard (2001) in particular highlights the use of photographs, videos, and narratives about objects depicted in a GIS layer that can serve as "extra layers in a GIS." In this vein, the incorporation of "situated knowledge and ethnographic material" may encourage users to employ GIS in an "interpretative manner" (p. 547). More recently, Knigge and Cope (2006) propose the integration of qualitative and quantitative data through grounded theory and visualization for an iterative, reflexive, and contextual analysis of community gardens using GIS. Dennis (2006) incorporates qualitative data like photographs, recording perceptions, and mental mappings of the neighborhood by local youths into a community planning GIS.

Other important features of new media include user and interface interactivity or, in the context of this article, interactivity between users (e.g., online forums) and nonlinear hyperlinked relations between specific sites (churches) and the networks that the sites are linked to. Internet-oriented research and hyperlink analyses constitute a relatively new methodology, and not many studies have comprehensively analyzed the scope and structure of websites of religious organizations. In this article, our main interest is to examine the nature of visible multi-data and artifacts deployed by Protestant churches in Singapore because, as shown in subsequent sections, attention to how they are constituted and represented online is quite informative in terms of the spatial meanings of the churches' socio-religious practices. Scheittle (2005), for example, analyzed the outgoing hyperlinks of 231 Christian websites, with hyperlinks representing social and symbolic congregational boundaries. Results indicated a relationship between theological conservatism, exclusion of other religious groups, and the inclusion of parachurch groups and religious resources via the hyperlink structures, but no website content analyses were conducted. Pauwels (2005) notes that websites are "a culturally modulated and situated technology and site" presenting opportunities for "online hybrid media research" (p. 1). Furthermore, Adam (1998) argues, "virtual places can be 'mapped' onto the topology and social structuration of physical places and processes" via an analysis of communicative links (p. 90). Thus, in addition to examining the scope and use of visible data among Protestant churches online, we also conduct a spatial analysis of their hyperlinks. Such analytical mapping augments the visual theme that is heavily adopted by churches and represents a strategy to comprehend the organizations' spatial relations.

(RE)PRESENTATION OF RELIGIOUS INFORMATION ONLINE

Central to the development of a critical geography of religion and online GIS is the recognition that the production of meaning and the production of identity are contested processes, which involve faith institutions and individuals, in the co-constitution of sacred place. The Internet allows the creation of communities of common interest away from institutionalized religion, but the medium is also influentially shaped by religious elites (Barzilai-Nahon & Barzilai, 2005). Drawing on previous research streams focused on the social construction of technology, Campbell (2005) argues for the advancement of a "spiritual shaping of technology" perspective that recognizes the extent to which religious communities domesticate the Internet and frame the technology in ways that make the Internet religiously acceptable and socially relevant. Kluver and Cheong (2007), for instance, investigated new ways in which technological modernization and religion coexist and mutually reinforce one another in Singapore as the Internet is shaped by religious leaders of diverse faiths for community building.

Thus, instead of merely presenting their religious organizations in cyberspace, in varying degrees, religious leaders are involved in the (re)presentation or framing of religious experiences and ecclesiastical information to develop networked communities and changing time–space instantiations (e.g., members accessing online materials anytime, anywhere, and being part of the church online). In this sense, websites may also be conceived as imagined spaces that reflect the codified representations of the spiritual vision of religious leaders. Religious leaders may ontologically map elements of cyberspace to control, engage, and build the religious community, and websites may thereby be seen as expressions of their power. Elwood (2006), for instance, contends that leaders of community organizations may apply their own interpretative frameworks to maps and images to produce flexible spatial narratives in order to reconstitute their engagement in spatial, institutional, and knowledge politics. Consequently, this research also investigates the role of agency and power in religious cybergeography. As Brace et al. (2006) argued, researchers should be sensitive to the "symbolic and communal aspects of religious identity formation and its spatialities" (p. 35). They advocate for more research to document the creative use of various media.

In this article, we argue that in addition to traditional media, religious websites, and the processes of the symbolic representations of religious practices online should be studied to understand religious spaces or "religioscapes" (McAlister, 2005), the "subjective religious maps" and "moral geographies" at work in the construction of sacred spaces (p. 251). This article expands on the limited research work on the conceptualization of offline and online religious spaces.

MAPPING RELIGIOUS CYBERGEOGRAPHY

Our study adopts an "ecumenical" approach to the exploration of religious cybergeography—an interdisciplinary and multiple-method data collection and analysis approach that is recommended for the study of new fields of media and religion (Buddenbaum, 2002). Data for this article are drawn from a larger study on religion and the Internet in Singapore. We also conducted a websphere and hyperlink analysis of 177 websites of Protestant Christian organizations. These websites represent a national sample of all the extant Christian organizations in Singapore with a website, and were comprehensively collated from various online Christian directories and the most recently published "Guide to Churches and Christian organizations in Singapore," a publication of the interdenominational National Council of Churches in Singapore (2006–2007). The distribution of websites among denominational traditions was as follows: Methodist (12.9%), Presbyterian (11.2%), Baptist (9.6%), Anglican (9%), Assemblies of God (8.4%), Independent (32.6%), Bible Presbyterian (6.2%), Brethren (3.9%), Reformed (2.8%), Lutheran (1.7%), and Evangelical Free (1.1%).

Websphere analysis comprises a content analysis of website features, including the history, background, faith beliefs, religious services, programs, map, location and accessibility, picture gallery, podcast, webcast, audio-visual, and online forum. The aforementioned variables capture our attempt to convert visible data online to transcripts, records, and counts that can be both quantitatively and qualitatively analyzed. However, as pointed out by Wagner (2006), visible data gain social, or in our case religious, significance when transformed into a process of comprehension and conceptualization. In this article, such a process of transformation is augmented with a spatial analysis of hyperlinks, which, as we previously noted, constitutes a special feature of the Internet. As we show later in this article in the spatial analysis of three of the largest churches in Singapore,[1] hyperlinks are popular among churches online, which is consistent with this article's overarching theme of virtual texts and images in multimodal representation and communication. Hyperlinks permit a nonlinear text and image structuring, and their use in cybergeography requires navigation through a network of hypertextualized pages.

Mapping religious cybergeography alone through the transformation and re-codification of visible data, however, only reveals part of the story and shows how Protestant churches represent their organizations online, including information related to organizational missions, placemaking, and community assets. As noted, religious

leaders shape technology use and domesticate virtual geographies for consumption among their members. Hence from the larger sample of churches with a website, we selected 20 religious leaders for in-depth, face-to-face interviews, as their role in religious representation informs much about how their websites are assembled and designed. Based on interviews conducted between June and October 2007, we also examined how church leaders (re)present and construct religion-online. Here, we draw from Chiavallon's (2001) examination of religious discourse by Caribbean Christians in the United Kingdom describing their religious experiences and perceptions of their local church. We apply her methodology of identifying "topological markers" in transcriptions to analyze whether and how religious leaders express "relations to specific places" when describing their online sites because "the lexis lends itself to a play on connotations, making it possible to speak of reality in spatial terms, notably in tropes" (p. 465). According to Chiavellon (2001), the search for what Mondada calls "typological markers" in religious narratives is justified as "space is conceived of both as created by through and as the schema for thought" (p. 465). Pseudonyms are used throughout the article to protect the identity of the organizations and interviewees involved.

MAPPING RELIGION-ONLINE

Visible Data and Representation

Websphere analysis indicates that 142 churches (80.2%) post information about their general organizational background, 103 (58.2%) contain specific information about the chronological history, and 136 (77.3%) provide information about their specific denominational beliefs and doctrinal statements online. A large proportion of the religious organizations also use the Internet for information sharing about their religious services (88.7%) and programs (81.4%)—for example, Sunday school, religious seminars, youth fellowships, and so on. A little less than half of the websites (41.7%) provided information on their non-religious programs for the community—for example, child-care and tuition programs, youth leadership classes, parental guidance workshops, and legal and medical services. More than two-thirds (67.8%) provide a map and/or link to a road map indicating the church's physical location. Indeed information on directions to the church can be quite sophisticated, as illustrated in Figure 1. The figure displays a localized version of Mapquest where the user's origin may be mapped based on postal code, street address, or location of subway station (MRT, mass rapid transit; LRT, light rail transit). Users who prefer to drive are further given option of selecting between a shortest distance algorithm or major road and expressway networks.

FIG. 1. Localized Mapquest.

On the other hand, the new media facilitate both spatial and religious experience by enhancing readers' or viewers' sensibilities in sight (graphics, visual) and sound (audio) (Table 1). More than one-third (37%) have an online picture gallery of photos of leaders and members participating in various community activities (e.g., church camps, baptisms, weddings and birthday celebrations). Eighty-four churches provide a live or archived podcast of their religious services and 15 churches offer a live or archived webcast of their religious services. Twenty-five of the 177 organizations provided a link to an interactive online forum or virtual community. The combined use of images, audiovisuals, and interactivity, in addition to maps, texts (e.g., description of church community), and numbers (e.g., membership size), enables sight and sound to be connected to place, which in turn reinforces religious community building, both real and imagined (see also Beilin, 2005). The photo gallery, for instance, promotes a visual experience of everyday life at the church that is supported by audio-based spatial narratives, and while technologically mediated, they nonetheless help maintain time-space continuity by allowing members to connect to the church at any time and from anywhere.

TABLE 1
Representation of religious organizations online

Religion-online	Total (%)
Background of organization	80.2
History of organization	58.2
Faith beliefs/vision	77.3
Religious services	88.7
Religious programs	81.4
Community programs	41.7
Photo gallery	37.1
Map of church	67.8
Webcast	8.5
Audiocast	47.5
Discussion forum	14.1

Note. N = 177 references.

Local websites further contain pages of "healing testimonies," "life stories," and "success stories," many of which document "inspiring and blessing stories" of church members whose lives have been "touched" during the church services. These stories paint a descriptive picture of the "church" and point to the importance of religious gathering, when, for instance, a story on a Baptist church website states, "I was overwhelmed with gratitude, and love for this church, as I was worshipping the Lord— with my three month son in my arms... memories of Pastor A and his team in the A event dating back to 1990 at the A place started flowing back."[2] It appears that narratives relating the familiar through textual representation of the spiritual significance of spatial experiences are used to cultivate readers' identification with the church. In this way, religious organizations featuring these stories online stress the embodiment of believers and explicitly reinforce the physicality of spiritual practices operant within their local churches.

Some churches also invite submissions from members to share "blessing stories" to build virtual community. Indeed interactivity is an important feature of the new media, where members are encouraged to build ties with the church through public participation online. In this way, the real and virtual intersect by increasing less hierarchical and more horizontal relations between the church and its members. It is interesting to note that in the case of a few organizations, besides the publication of members' stories, the pastor of the church also has a personal blog linked from the website's homepage, where weekly updates about ministry work, travels, and prayers are published. Blogging develops proximal spaces by annihilating relational distance between the pastor and readers while maintaining the pastor's moral authority as a gatekeeper of religious knowledge.

Moreover, in some cases, information about the church programs are not only presented online, but also updates may be available to members subscribing to RSS (Really Simple Syndication) feeds. RSS feeds are Web feed formats used to publish frequently updated church content, including blog entries, news, web, and podcasts. Internet users may subscribe to a church's feed by entering the feed's link into a reader, or by clicking on the RSS icon on the website. Once installed, the reader automatically checks the user's subscribed feeds regularly for new content, downloading any updates that it finds. In this way, websites of religious organizations may serve not only as a repository of information but also as a dynamic extension of religious news and emergent church-related information.

The preceding findings from websphere analysis reveal the creative use of multiple forms of visible data, functions, and instruments to enhance sight and sound and to connect these senses to place and religious life. One church further attempts to localize place and community through architectural visualization of the construction of its multi-million-dollar church building. This organization describes the anticipated built form to be "an integrated civic, cultural, retail and entertainment hub," "slated to become an iconic landmark in Singapore in the up and coming neighborhood of NX." Architectural visualization is accompanied by attempts to clarify the building's design composition and spatial relations, which it describes as in "perpetual symbiosis with community." The narratives are augmented by a video clip, which presents the building in three-dimensional space, with a voiceover describing the architecture and capacities of various rooms. In another example of a Charismatic church, news of the construction of a new complex of four buildings to house the group's worship center, community care services, theological college, and leadership network is featured prominently on the church's website. Moreover, the website provides a location map of the complex (situated between two upcoming train stations), and pictures of the three-dimensional model of the complex's main entrance, front signage, views from different roads, and two pictures of the surrounding landscape. The website captures Chiavallon's (2001) notion of topological markers by describing the church architecture to have a "distinctive face" designed like a "mountainous landscape" to "reflect the story of creation and life of Jesus," given that significant events in the Bible took place on the hills. Various pages online also show quarterly updates of the complex's construction with PowerPoint slides of pictures taken at key locations, and host an online video showing a presenter with a microphone, reporting from the construction site. What these examples serve to illustrate is that the multimodality and multifunctionality of the Internet enable churches to generate an immediate presence as a nearby community

asset. For instance, one church used the visual, auditory, and textual self-descriptions in an integrated way to communicate its role as a "first class cultural center" and "vibrant civic node" that functions as "an integrated hub."

Embedding the church within local community and civic life draws upon imagined identity. For example, the video clip of an Assemblies of God website features a presenter interviewing various persons about "what it means to be a member of Church AG" at various prominent locations of the church (e.g., outside the gate, beside the stained glass panels, in the atrium, etc.), expressing how they are proud of the "vibrant atmosphere" in this "awesome place with awesome people." In one scene, two children interviewed said they "like God's presence here, like to worship here, it is fun, and I can learn more things," before jumping in unison to say, "we love Church AG." At the end of this video, the presenter says "You can see that AG church is indeed an exciting place for everyone [points to the building behind], it is evident that all of these lives have been blessed and enriched and so perhaps you too may want to share the excitement as you join them to say, We are Church AG." Furthermore, on another page, the website presents the church's "We care and connect" photo and song-writing competition where viewers may see the photographs and hear the winning songs online contributed by members online. These exemplars highlight how geographical markers and symbolic meanings intertwine in a crucial discursive space online. Rather than eliding the real or physical geography of the church, the virtual space of various religious organizations function as a "proximal" sacramental space where members connect by being and imagining themselves as part of "the body of Christ," reinforcing the importance of church grounds.

While the preceding description points to the capability of the new media to support multiple data, functions, and instruments that potentially expand GIS use and communication, they nonetheless are becoming important objects of social and geographic inquiry. In the final paragraphs of this section, we focus on specific examples of Web representations that capture another dimension of the visualization of visible data online through churches' networks of hyperlinks. With hyperlinks, viewers are able to annotate parts of online texts and images. Hypertextuality expands a church's spatial domain by allowing the organization to extend the visual, auditory, textual,
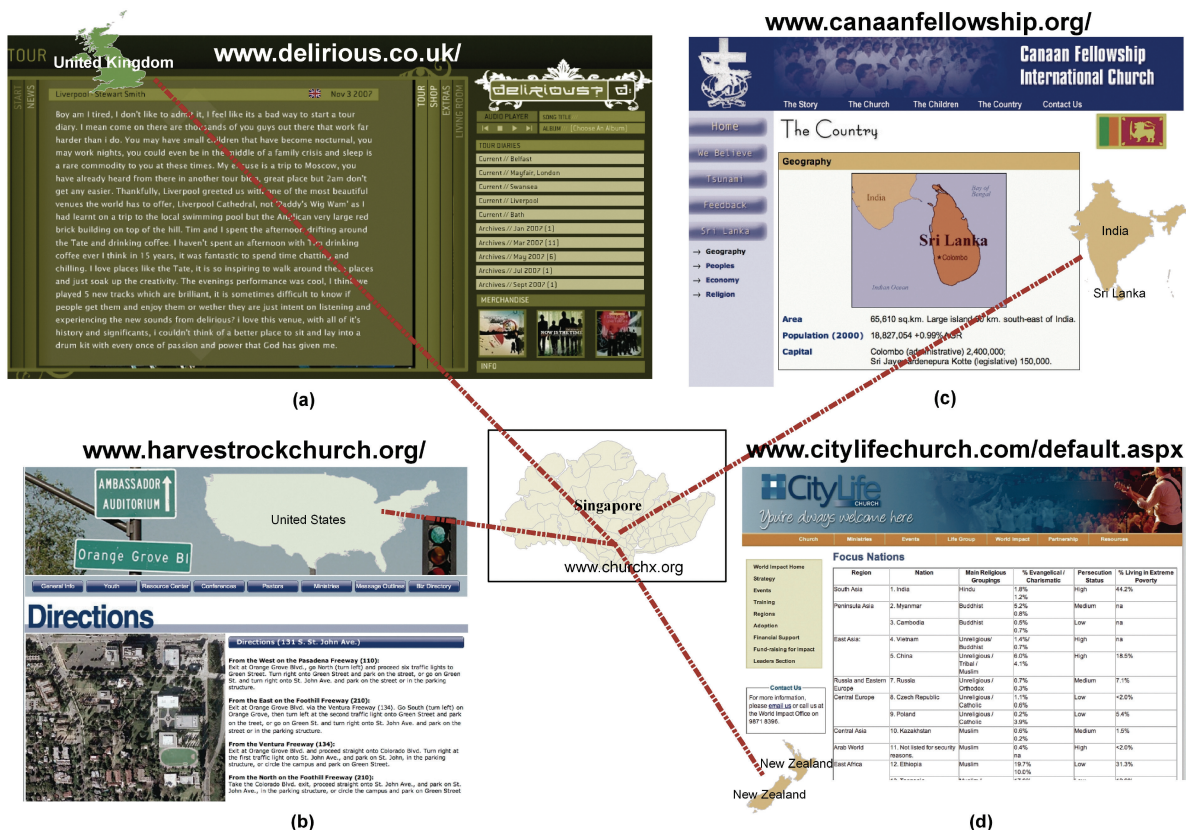
FIG. 2. Examples of geographic information based on hyperlinks: (a) the band Delirious's diary, (b) Harvest Rock Church's directions, (c) Canaan Fellowship International Church's description of Sri Lanka, and (d) City Life Church's geographic analysis of religion.

and thereby experiential breadth of its readers. Figure 2 illustrates such expansive forms of geographic information used by three churches to overcome their own limited representations and as explained to us by one church pastor: "We are not very good writers," and therefore "most of the writers are still from the West." Cultural influence on website design (see Edsall, 2007) may also explain why our hyperlink analysis using connectivity indices[3] shows that the churches' transnational hyperlinks are predominantly centered on the West (Figure 3, a and b). The indices are calculated by counting the number of

hyperlinks, either inlinks or outlinks, for each church associated with a particular country. For example, if Church X has a total of 15 outlinks and 3 of those are of websites based in the United Kingdom, the connectivity for that church with the United Kingdom is 3.

As seen in Figure 2, geographic information online spans both objective and subjective forms. The nature of the information also varies, as Singapore churches skillfully select and integrate a diverse and international representation of religion-online. The most common hypertextual spatial information is associated with maps
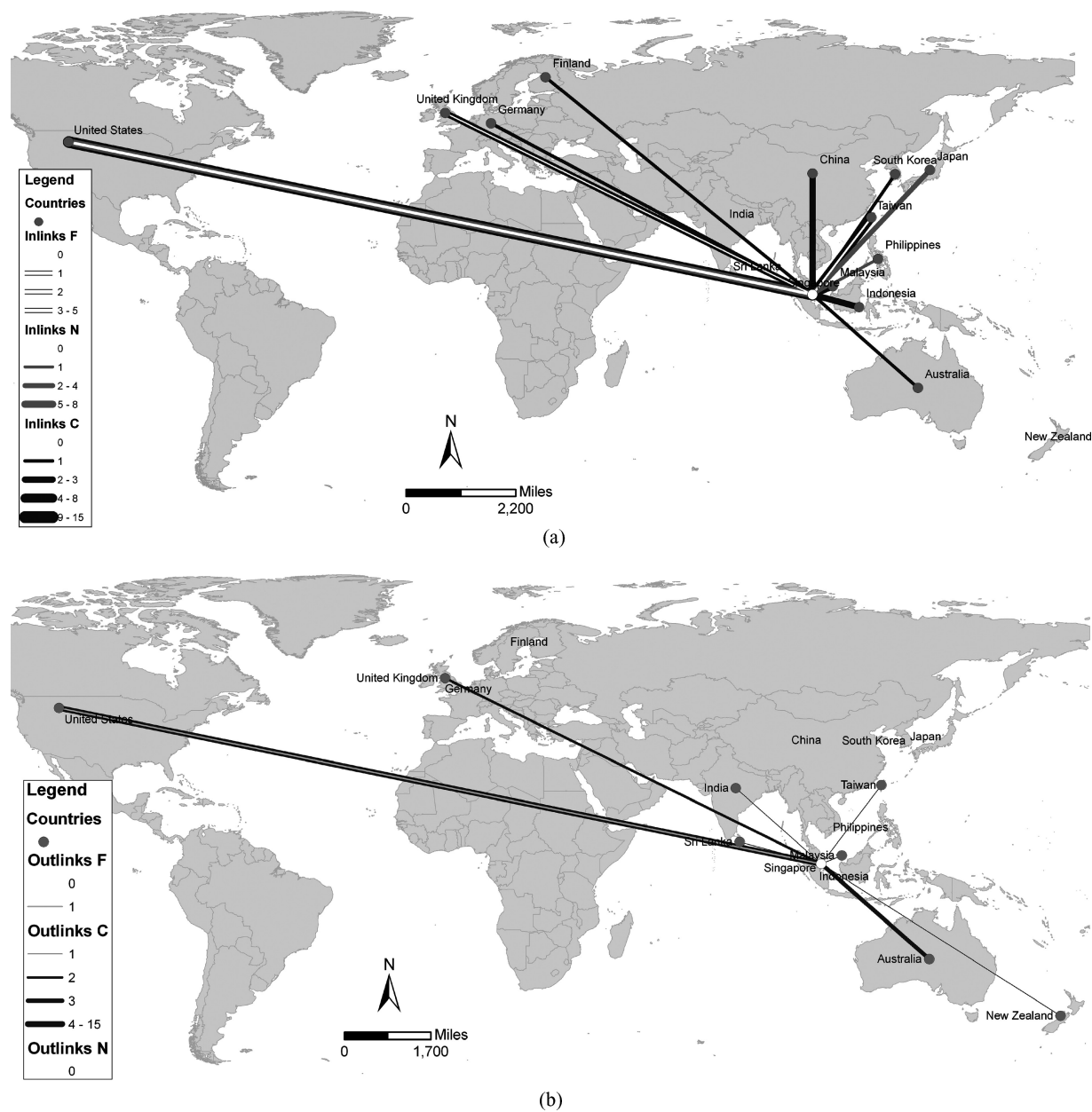

FIG. 3.   (a) Inlink map of three churches. (b) Outlink map of three churches.

and location such as Google Earth images, as illustrated in Figure 2b. Other types of geographic information include an inventory of physical and sociodemographic characteristics (Figure 2c), a market analysis of world religions (Figure 2d), and the travel diaries of a Christian rock band in the United Kingdom, communicating the band's spatial experience performing in various cathedrals and cities (Figure 2a).

While there is some variation among the three churches (F, N, and C), the hyperlink analysis in Figure 3, a and b, indicates that their networks are dominated by connectivity to the West, including the United States (US), United Kingdom (UK), and Australia. Similarly, the West is also fairly well linked to churches in Singapore, though Figure 3b also points to many Asian connections, suggesting the effectiveness or popularity of religious information on the Singapore websites. Overall, hyperlink analysis extends and broadens visible, visual, and auditory geographic sensibilities online by bringing in a multiplicity of both religious and spatial knowledge forms. Because of their nonlinear structure, socially situated understandings of religious life, place, and practices may be built as readers develop and assemble their own individual framework of spiritual and spatial coherence using various materials and data.

Constructing and (Re)Presenting Religion-Online

Like most technological systems, new media are embedded in complex social processes because their design, use, and appropriation are socially negotiated among users, system designers, and, in the context of this article, religious leaders and webmasters as well. As a social innovation, website design is influenced by the cultural norms and values of those who are engaged in the process, including issues covering symbolic and informational content.

Furthermore, Samarajiva (1996) notes that virtual spaces constitute a place where social actors produce, allocate, and distribute authoritative resources in order to achieve meaningful communication. Specifically, exercise of power is manifest in the designed environment as visible data, and the artifacts that support and transmit data are generated from a terrain of social interactions, which are embedded in human action and decision. In this article, website design and representation of churches are argued to be intertwined with religious institutions and structures, the latter of which influence cultural norms. The power of religious leaders to shape their own sociotechnical environments is thus instructive if we view the Internet in terms of a social innovation that potentially transforms religious practices, including traditional loci of control among religious elites. The preceding statement implies that representational practices associated with various visible data described in the previous section are incomplete

without understanding the production relations of technologies and, more specifically, how religious leaders domesticate the Internet for consumption among its members and the public. Based on personal interviews with 20 pastors, we highlight next the ways in which their roles as gatekeepers of religious knowledge contribute to the building of place and community on the churches' websites.

Religious leaders generally perceive the Internet as a medium for "giving [members] information," and this is consistent with the broad informational content of many websites that we examined in the previous section. Typically, geographic information revolves around location and accessibility, but other religious information associated with church activities, community programs, and social missions is also common. Our interviews further suggest that there is a sense that geographic information needs to move beyond attributes of location and be customized or localized in order to achieve "branding" that distinguishes individual churches. Hence one pastor observes:

> "I think if you just look at our website, our magazines, we have come to a place where we recognize this is the T Church look."

The significance of branding among some churches may perhaps be explained by the history of Christianity itself. Ekelund et al. (2006) correlate the rise of Protestantism to the positive forces of religious competition where socially constructed differences and identities encouraged the proliferation of Protestant denominations and religious pluralism, unlike the more Universal Catholic Church. Interestingly, they attribute the source of religious competition to technological innovation, including the democratization of biblical texts and knowledge with the advent of new printing techniques. In a sense, the media have always played a central role in religious missions, and the Internet is not different in this respect. Indeed, the Internet is perceived among church leaders to be forward-looking in a "visual, sight and sound generation," and as one pastor informs us:

> "I think the church has to be leading, you know, and not lagging behind. So definitely videos and flashes that [use] movement, sight and sound is something that will be appealing to this generation."

This explains to a large extent the relatively popular use of audiovisuals and online video clips on the websites that we examined. Not only are such artifacts "attention catching" but, as pointed out by another pastor, they also enhance church branding.

> "If you don't have that, you don't have movable clips and all that, then people will very quickly go on to other websites that are more interesting. So there is a kind of competition there whether you like it or not. If somebody has a more

colorful attractive animated website, they probably attract a following."

Religious competition also implies that church leaders seek spatial and temporal connectivity and continuity to increase religious stability of their own communities. Religious stability is reinforced by encouraging patterns of social interactions that support community identity and relations. Religious leaders are also cognizant of religion-online as a technologically mediated interaction-based social activity where the Internet provides a multichannel, multimodal social space. Hence there is a perceived need to convey the church as a "community that binds, a sense of belonging." One pastor reveals that religious stability and community identity are embedded in place, which is sometimes virtually expressed on the homepage of his church's website.

> "We make a very strong emphasis about that [community]. We keep very closely focused but in terms of life day-to-day living, people that come, I want them to sense this is home. This is a community."

To encourage social interactions that support community relations, one pastor decided to write a blog so that her friends in the United States would experience: "Oh, I just feel like I had coffee with you, you know. When I read that, it was just like talking to you." Her blog generated feedback, which she believed helped decrease social distance between the church members and her, reflecting how religious blogs help integrate the personal and the communal (Cheong et al., 2008). The church further cultivated community loyalty by posting the birthdays of their members online. The pastor explains:

> "Let's say June 3rd, you know, J.'s birthday. So you can click on his name and then you can automatically go to the card, make your own card. So I did that for a whole year and a half for every single person in our church. I sent them a birthday card and people were like, 'Wow' I can't believe you sent me a birthday card. People I don't even know in church came up to me. I wouldn't know what their names were, but they're like 'Oh thank you so much'. That was a great way for me to stay in touch."

Representational practices of religious leaders point to rituals, place, and other identity-supporting instruments (e.g., birthday e-cards) to develop more predictable communities. While religious leaders note the "secular" nature of visible data, at the same time, they defend their role in the assembly and design of the websites as illustrated by one pastor:

> "So you say oh it's secular . . . there's always this dilemma you know. People want very spiritual things but at the same time, . . . they also want the leadership to be in touch with the world . . . we want to make ourselves relevant to the community."

Indeed, this pastor is currently exploring the possibility of a more inclusive participatory form of social interaction by creating a "teen chat" for the church's youths.

Overall, the analysis of interviews in this section with church leaders shed some light on the decisions behind the use, design, and assembly of websites. It is fair to say that in our sample, churches possess differing technical capabilities: Smaller churches tend to represent simpler spatial facts (e.g., direction, location, description of church's role in the community), while larger churches with greater resources are more inclined to exploit the Internet's multimodality to support multiple data forms and artifacts that help build more complex spatial and socially situated knowledge about their communities and religious life.

CONCLUSION

Goodchild (2000) notes that digital technology has fundamentally changed the role of GIS use from a processing engine to a communication medium where shared understanding increasingly plays an important role. To the extent that human cognition draws upon qualitative reasoning, not just algorithms, as research in artificial intelligence has shown (Poon, 2005), examining how religious organizations assemble, represent, and (re)-represent sacred place, community life, and religious practices helps to clarify the role of online communication. Map production has become more automated and thereby accessible, as our study has shown, with nearly 40% of the 175 Protestant church websites examined hosting a map that locates individual churches. In a few cases, direction and location are quite sophisticated, providing readers and members with advanced Mapquest functions including navigation between shortest distance algorithms, expressway networks, and the public transport system. Interestingly, hyperlink analysis indicates that US-based churches that are linking up with Singapore churches tend to augment maps with Google Earth images.

Where the new media appear to be playing an important role in new forms of online communication, however, is most apparent in its multimodality, multifunctionality, and multi-instrumentality. All virtual objects have important material and visible aspects (i.e., visible data and artifacts), and churches are combining textual, visual, and auditory forms of visible data and functions in addition to maps to extend geographic sensibilities among their viewers and readers. In particular, church leaders believe that their communities are increasingly characterized by a visual culture that calls for more expansive channels of communication. Clearly, offline and face-to-face communication that occurs in real and physical church space is more likely to stimulate multiple impressions regarding

place compared to the Internet, where sensations are mediated (Wood & Smith, 2004). Yet the Internet is perceived to offer capabilities that enhance visual senses in particular.

Our website analysis and interviews with church leaders indicate that larger and relatively well-attended churches are more likely to represent their communities visually and auditorily in order to distinguish themselves through branding. These are achieved through videoclips, audio-visuals, architectural visualization, and spatial narratives that simulate real and imagined places, offering viewers and readers the opportunity to see and hear what subjects see and hear. Moreover, the interactive functions afforded by the Internet allow churches to develop more horizontal relations with their members by opening up multiple channels of communication in time and space. Hence pastors are writing blogs and inviting comments from members and seekers.

The preceding discussion suggests that the Internet contributes to a more participatory process and that church leaders are encouraging community building and identity by having members construct their own photographs and narratives online that reflect members' own cognitive frameworks of everyday spatial experiences related to the church. Online communication in this sense goes beyond the organizational control of both religious and geographic facts, since church leaders recognize the difficulty of regulating information online. Rather, we found Singapore churches hyperlinking to websites globally, particularly in the United States, United Kingdom, and Australia, to access other forms of spatial data, knowledge, and experience so as not to be limited by their own representations. In turn, churches in Asia are linking to Singapore churches to access similar information.

In conclusion, the Internet and new media enable representational practices that are creating new social practices of communication. This article has attempted to understand the nature of these social practices through the lens of religion-online. Religion-online practices use the Internet not only to transmit information about religious and community life, but also to communicate subjective community experiences augmented by visual and auditory geographic sensibilities.

NOTES

1. The three largest churches were selected for spatial hyperlink analysis because of the breadth and depth of their transnational reach.

2. Note that pseudo names of places and individuals are used to protect the identities of the churches and interviewees.

3. For the calculation of the indices, if it is not possible to obtain the geographic location from the website based on its contents, the location used is that of the website server provider (e.g., Wikipedia entries, Yahoo directories).

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