

## ONLINE ACCESSIBILITY AND INFORMATION NEEDS OF DISABLED TOURISTS: A THREE COUNTRY HOTEL SECTOR ANALYSIS

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### ABSTRACT

Information is the lifeblood of tourism, influencing individual motivation to travel. Whilst the WWW offers opportunities for information's ready supply and exchange there are often issues surrounding access to it, most notably, but not exclusively, for disabled users. This is the topic of web content accessibility. This paper assesses the accessibility of Australian, UK and US-based hotel-accommodation websites. Moreover, given the high-involvement nature of the travel decision for disabled travellers, the study also assesses whether the information published meets the needs of the disabled. The study finds low levels of accessibility and little specific information that is likely to meet the needs of some disabled consumers. It concludes that organisations are a long way from meeting competitive, legal and technological imperatives for accessibility.

Keywords: Internet, World Wide Web, Accessibility, Disabled, Tourism

### 1. Introduction

By breaking down the constraints of distance, time, and place [Pitt et al. 1999], internet-based technologies present new possibilities in the ready supply and exchange of information. Moreover, with increasingly ubiquitous internet computing, this ready supply and exchange of information has already had, and will continue to have, a considerable impact on the nature of business relationships. However, at least one factor, 'web content accessibility' (hereafter 'accessibility'), needs to be considered for all groups in society to be able capture the potential benefits on offer. For a site to be accessible 'Anyone using any kind of any kind of web browsing technology must be able to visit any site and get a full and complete understanding of the information contained there, as well as have full and complete ability to interact with the site' [Letourneau cited in Elliot, 2004].

Accessibility issues are perhaps most readily identified with the needs and capabilities of disabled individuals. This group has received relatively little attention in the literature when it comes to their particular needs and capabilities as consumers [Kaufman-Scarborough 2001], and arguably even less when it comes to their needs as online consumers. Yet, and this is the first of two reasons for dedicating this work towards their accessibility needs, this group comprises a sizeable and growing proportion of the marketplace, with, it must be also be noted, considerable discretionary expenditure. For example, considering just one group likely to have particular needs and capabilities, statistics from the American Foundation for the Blind indicate that there are approximately 10 million visually impaired individuals in the USA of which 1.3 million are legally defined as blind. From a purely competitive point of view, addressing the online accessibility needs of the disabled has therefore something of a competitive imperative about it [Williams & Rattray 2003; Loiacono & McCoy 2004].

In addition to the competitive imperative, other additional imperatives exist to consider the online accessibility issue. First, on the basis that access to information involves the civil rights of individuals [Waddell 1999; Yu 2002], a developing legal mandate for online accessibility is emerging (see for e.g. Amendments of the US Rehabilitation Act, 1998 and the UK's Disability Discrimination Act, 2004). Increasingly therefore, online accessibility will

become a compliance issue. Second, whilst accessibility issues are most commonly associated with the ‘registered’ disabled, other individuals in our communities, although not registered disabled often face similar access barriers. This is a principle readily demonstrated with the example of graded sidewalks [Corcoran & Corcoran 2002]; graded sidewalks provide obvious benefits for those in wheelchairs, however they are also useful for mothers with pushchairs, lorry drivers delivering goods, and indeed those who, whilst not registered disabled, are limited in their mobility (e.g. the elderly). Importantly, the notion of good (accessible) design benefiting all, or at least having significant spill-over effects, is not exclusive to the physical world. For example, websites designed to meet the needs of those visually disabled or impaired individuals using a screen reader are also likely to meet the needs of those using a text-based browser for bandwidth reasons. Arguably, accessibility is therefore about much more than just disability, it is about interoperability, a fact that serves to increase its competitive imperative for firms still further.

Building on the important competitive, legal and technological-interoperability imperatives for online accessibility, this paper sets out to develop further the relatively small body of research that currently exists in this area. Focussing on the travel-tourism industry, an industry in which information is acknowledged to be its “lifeblood”, as without information the individual’s motivation and ability to travel are severely limited [O’Connor & Frew 2002], the first objective of this study is to assess current levels of website accessibility. Specifically, the study assesses the level of accessibility of hotel-accommodation websites. Whilst an interesting sector of study, given the important role of information gratification in terms of motivation and ability to travel as well as the fact that the parties frequently face considerable physical separation in the pre-consumption – decision-making phase, the hotel-accommodation sector is also interesting in that the ‘product’ is for many disabled individuals a ‘high involvement’ one. This means that whilst access to information is important, the quality of information offered is also important. For example, motor impaired individuals using an assistive technology require websites to function for them, allowing them to readily navigate the site retrieving information on reservation date availability, cost etc. However, they also frequently need some specific information to meet their particular needs. An obvious example might be the need to retrieve information regarding the availability of car parking or an elevator. Thus, whilst contributing to a relatively limited body of research reporting on levels of accessibility, laudable in its own right in terms of building up cross sectional and longitudinal data sets, the second objective of this study is to assess whether hotel-accommodation websites meet the informational needs of consumers with particular needs and capabilities. Addressing one other gap in existing research, a lack of inter-country comparison in previous studies (indeed, work has tended to focus on American websites), the third objective of the study is to make comparative assessments of both access to information and the degree to which that information would comprehensively meet the informational needs of disabled consumers by assessing the websites of three countries: Australia (Au), the United Kingdom (UK) and the United States of America (USA).

## **2. Web Content Accessibility: Competitive, Legal and Technological Mandates**

A considerable amount of endeavour is usually directed at obtaining web traffic, those valuable ‘eye-balls’ that can be converted directly or indirectly into customers. However, much of this endeavour could be in vain if, having obtained traffic, the content of the website is not accessible. Whilst it appears anomalous that some individuals may have difficulties accessing the content of websites, differing needs, capabilities, and situational constraints may act as barriers unless understood and addressed through web design and development. Consider for example the 1.1 million people in the UK who are eligible to be registered blind or partially sighted [cited in Oppenheim and Selby, 1999]. Many of these individuals will perhaps be using one of a number of assistive devices. In the case of a blind or visually impaired individual they may be using an assistive technology such as a screen-reader (e.g. “JAWS” – Job Access with Windows). When used with a browser, JAWS announces text and image content, and will note the presence of hypertext links (clicks). However, content is only efficiently revealed to the user if, for example, the text is announced in the right order and images are identified fully. In the case of images, equivalent alternative text (an ALT tag) will need to be added. If it is not, the individual using a screen-reader will remain unaware of the purpose of the image. Likewise, if an image is used as a spacing device or for ornamental or design reasons and as such provides no helpful content, the use of a blank space alt tag (alt=“”) will result in the screen-reader (correctly) ignoring the image completely. Beyond those who may be facing barriers due to a visual impairment, others may also face access barriers to website content. For example, some individuals may have difficulty moving or processing some types of information, perhaps by not being able to use a keyboard or mouse.

Importantly, the rationale for considering online accessibility; i.e. the disabled, is not a case at the margin. Firstly, the WWW is what it says it is - world wide. A firm’s marketplace is not necessarily those individuals located solely within its own national boundaries. Thus, whilst the size of the domestic disabled marketplace is significant in its own right (e.g. according to Lloyd [2003] US disabled travellers spend more than \$13 billion a year on travel-

related services, including more than 17 million hotel visits), the significance increases further in light of a UNESCAP estimate [cited in Yau et al. 2004] for 5-20% of the world's population to be disabled. Importantly, early statistics for the number of disabled and challenged individuals already online are a not insignificant 8% (GVU 10<sup>th</sup> User Survey) and 10-20% share of the online population [ican.com cited in Salamone, 2002]. As the internet's demographic becomes more representative of the population as a whole, rather than of early adopters, penetration figures such as these can only increase. Moreover, to make clear the point about accessibility, merely being online is not always enough. The benefits of being online can only be fully reaped if the websites out there in cyberspace are accessible.

A further factor increasing the significance of the disabled as online consumers is: [a] the shift from a triangular population structure, in which old age was unusual, to a nearly rectangular distribution of ages through the population [Hawthorn 2000]; and [b] a strong positive correlation between age and disability [Myhill 2002]. Indeed, as one in three US citizens is predicted to be over the age of 50 by the year 2020 [Weinstein cited in Kaufman-Scarborough, 1998] one might expect the 19.3% of the US population reported in the 2003 US Census as having a long lasting condition or disability to increase further and for this trend to be mirrored elsewhere. One further impetus to consider the often ignored disabled market is a recognition that the disabled consumer frequently travels as part of a group of friends or as part of a family. The market potential therefore stretches beyond the immediate statistics for the disabled [Yau et al. 2004].

Whilst existing demographics as well as trends in the demographics point to the disabled as a sizeable and growing group in society, other, non-disabled individuals will share many of their characteristics, furthering the imperative to consider accessibility needs. For example, progressive visual impairment (e.g. difficulty in adjusting focus, visual acuity, and the ability to see fine details) increases with age, and in fact becomes noticeable from the mid-forties onwards [Hawthorn 2000]. These individuals, whilst not disabled, might nevertheless require a larger font size and/or perhaps a more distinct contrast between background and foreground colours for them to be able to efficiently access online information [Hackett et al. 2005]. Issues of visual access are not therefore the exclusive domain of the registered blind or the elderly. Indeed, taking this point further, other age independent factors may also create visual access barriers. For example, the 1 in 12 males, reported to have colour deficient vision [IEE 2004], may face potential barriers to content given that colour frequently communicates information through learned associations.

Beyond sensory disabilities and impairments such as those associated with vision, another significant group is the 4% of the population reported as severely dyslexic, together with the further 6% reported as having mild to moderate problems (bda-dyslexia.org.uk). To reiterate, website accessibility cannot therefore be considered to be just about access for the disabled, or indeed the result of aging. Rather, it has a broader remit.

Extending any competitive imperative arising out of disability or impairment is a technological one. This imperative extends the general design principle that good design is frequently good for all [Vanderheiden 2000]. For example, blind or visually impaired individuals using a screen-reader want to be able to 'scan with their ears' rather than with their eyes, and can do this, as intimated earlier, with an assistive technology such as the screen-reader 'JAWS'. Good design, accommodating the needs of an individual using a screen-reader, provides important context information alongside a link or image. It allows the link/image to be useful on its own. Links such as "click here" therefore fail in this respect. However, whilst good context information alongside links/images supports efficient browsing for those individuals using screen readers, it also supports those individuals in non-standard browsing environments. For example, it supports individuals using text-based browsers who likewise do not "see" web pages. The requirements of individuals with particular disabilities are linked therefore to those who face barriers because of their environment or their browsing device [Hull 2004]. This need to accommodate a plethora of needs and capabilities by considering accessibility is further reinforced with the emergence of a new mobile, wireless marketplace. Increasingly, individuals are likely to have an e-communications portfolio, utilising different (wired and wireless) devices at different times according to their circumstances and constraints at any one moment. This scenario has already tentatively appeared in recent literature in the context of hotel marketing [Louvieris et al. 2003]. For example, a sales representative may use wired internet access through a traditional PC/browser in the office, and at another time/place, wireless internet access through a personal digital assistance and non-standard (text-based) browser. Recognising this, organisations will have to work to maintain a 'seamless conversation' across the devices utilised because of needs, context and stage in the travel decision-making process, a task that will require, at the very least, some consideration of accessibility issues.

Beyond the competitive and technological imperatives for accessibility to be on the agenda of web publishers, a further important imperative is an emerging legal mandate. As access to information invariably involves access to opportunity and participation [Waddell 1999; Yu 2002], discrimination legislation gives civil rights protection to those individuals with disabilities. The legislation acts to provide rights to the full and equal participation and

enjoyment of goods, services, privileges, and advantages of public spaces. In the physical environment, marketers understand and acknowledge this legal mandate. This developed legal mandate is likely however to merely be a precursor for a mandate that stretches to the online environment as well. Indeed, some limited case law has already ruled on online accessibility (see for e.g. Sloan, 2001 and his discussion of the Australian case of McGuire vs. Sydney Organising Committee for the Olympic Games). Moreover, in terms of the other two countries in this study, the application of discrimination legislation also appears unequivocal. First, The UK’s ‘Code of Practice: Rights of Access, Goods, Facilities, Services and Premises 2002’ issued by the Disability Rights Commission to accompany the Disability Discrimination Act expressly includes online examples of services: ‘An airline company provides a flight reservation and booking service to the public on its website. This is a provision of a service and is subject to the Act’ (Available at: <http://www.drc-gb-org> paragraph 2.17). Second, the US Rehabilitation Act Amendments of 1998 (known as Section 508) set standards requiring all electronic and information technology developed or purchased by the US federal government to be accessible to individuals with disabilities (s. 508, US General Services Administration, Available at: <http://www.section508.gov>). Accessibility will, it seems, at least over the medium – longer term, be a compliance issue.

**3. Web Content Accessibility: Standards and Previous Research**

Given competitive, legal and technological imperatives for accommodating the online needs and capabilities of individuals facing barriers to content for one or a number of reasons, a logical next step in meeting the first objective of the paper (assessing current levels of website accessibility) is to identify practices and standards for accessible web design. Fortunately, the *de facto* standards setting body for the web, the World Wide Web Consortium (W3C), and its Web Accessibility Initiative (WAI) have produced a comprehensive set of Web Content Accessibility Guidelines (WCAG) for ensuring accessible design.

The WCAG set out design principles that, if followed, enable access. These are grouped into three levels; Priority 1, 2 and 3. The first priority level (priority 1) sets out 16 design principles that, for the W3C, a web content developer must satisfy because of the benefits they confer on users with particular needs (Table 1). If one or a number of these principles are not followed, one or more groups will find it impossible to access information in the document. Satisfying the Priority 1 checkpoint is therefore arguably a basic requirement for some groups simply to be able to use web documents. Moreover, as accessibility for existing websites at this level can also be achieved with relative ease [Davis 2002], these have been the checkpoints most frequently utilised in the existing, limited, prior research reporting accessibility levels.

Whilst satisfying all three levels would ensure comprehensive accessibility, the Priority 1 guidelines must be satisfied simply for some groups to be able to use web documents. In the absence of a clear legal definition for accessibility, Priority 1 arguably represents therefore the minimum accessibility requirement of a website, albeit one that nevertheless still offers considerable benefits to users.

Table 1: Priority 1 WCAG Checkpoints and Benefits

Priority 1 Checkpoints	Benefit of compliance
<p><u>1.1</u> Provide a text equivalent for every non-text element (e.g., via "alt", "longdesc", or in element content). <i>This includes:</i> images, graphical representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ascii art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video.</p>	<p>Displays for: [a] visually impaired visitors using a voice output program with a text-based browser and, [b] those using a graphical browser choosing to load web pages with the images turned off. Allows information presented via graphs, charts, diagrams, etc., to be accessible to persons with visual impairments and will assist users with learning disabilities and those for whom English is a second language. Will permit users with hearing impairments or those connecting through systems without audio support to access the same information.</p>
<p><u>2.1</u> Ensure that all information conveyed with color is also available without color, for example from context or markup.</p>	<p>Web pages will be easier to read by those with low vision or learning disabilities. Busy or textured backgrounds or color combinations with low contrast are difficult for most users to really see easily.</p>
<p><u>4.1</u> Clearly identify changes in the natural language of a document's text and any text equivalents (e.g., captions).</p>	<p>Will avoid confusion for individuals accessing the site using text readers or text only browsers.</p>
<p><u>6.1</u> Organize documents so they may be read without style sheets. For example, when an HTML document is</p>	

rendered without associated style sheets, it must still be possible to read the document.	
<u>6.2</u> Ensure that equivalents for dynamic content are updated when the dynamic content changes.	
<u>7.1</u> Until user agents allow users to control flickering, avoid causing the screen to flicker.	Avoid confusion for the visually impaired as well as danger for epileptic users.
<u>14.1</u> Use the clearest and simplest language appropriate for a site's content.	Assists <i>all</i> visitors to your website, especially those with learning or cognitive disabilities
<b>And if you use images and image maps (Priority 1)</b>	
<u>1.2</u> Provide redundant text links for each active region of a server-side image map.	Will avoid confusion for individuals accessing the site using text readers or text only browsers.
<u>9.1</u> Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.	Improve accessibility and usability by giving the user the ability to control the process of accessing information.
<b>And if you use tables (Priority 1)</b>	
<u>5.1</u> For data tables, identify row and column headers.	Most screen readers interpret information in tables from left to right rather than up and down. Magnifiers may render large tables unreadable. This action will prevent confusion for the visually impaired and those accessing information with text only browsers.
<u>5.2</u> For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.	
<b>And if you use frames (Priority 1)</b>	
<u>12.1</u> Title each frame to facilitate frame identification and navigation.	
<b>And if you use applets and scripts (Priority 1)</b>	
<u>6.3</u> Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.	Will avoid confusion for individuals accessing the site using text readers or text only browsers.
<b>And if you use multimedia (Priority 1)</b>	
<u>1.3</u> Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation.	
<u>1.4</u> For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation.	
<b>And if all else fails (Priority 1)</b>	
<u>11.4</u> If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page.	




**Source:** <<http://www.w3.org/TR/WAI-WEBCONTENT/full-checklist.html>> (Accessed 22.11.02)

**Notes:** [1] Checkpoints numbered (ordered) as per original,  
[2] Benefits adapted from Lilly and Van Fleet [2000].

Over time, or for planned new sites, to increase the accessibility of their pages further extending the benefit of access to information, organisations should, of course, work towards meeting the additional checkpoints at Priority levels 2 and 3 (available at: <http://www.w3.org/TR/WAI-WEBCONTENT/#Guidelines>).

A signalling device in the form of a web Seal (or logo) is available for websites that conform to the specific levels of the WCAG. A Level 'A' seal implies that all the Priority 1 level WCAG have been met, with 'AA' and 'AAA' seals respectively implying Priority levels 2 and 3 have been met (Table 2). In a marketing sense, seals of this type signal trust to users [Dean & Biswas 2001]. They are a third-party endorsement of the site, intimating something of the characteristics of trustworthiness (widely taken as the ability, integrity and benevolence) of the organisation publishing the website.

Table 2: W3C Compliance Seals

		
Conformance Level "A": Priority 1 checkpoints satisfied.	Conformance Level "Double-A": Priority 1 and 2 checkpoints satisfied.	Conformance Level "Triple-A": Priority 1, 2, and 3 checkpoints satisfied.

To date, relatively little work reports statistically on the accessibility of websites. Moreover, what work there has been has tended to focus on public or public-affiliated websites, rather than commercial websites. This focus is unlikely to present a representative picture of accessibility, as public and public-affiliated websites (e.g. library sites) have long had information dissemination and particularly widening participation on their agenda. Accordingly, the library website Priority 1 accessibility levels reported by Lilly and van Fleet [2000], Craven [2000] and Schmetzhe [2001] at respectively 40%, 37% and 59% are not to be found outside of this arena. Indeed, Jackson-Sanborn et al. [2002] report Priority 1 accessibility at 33.9% for an average of six genres of sites. Removing two of the six genres - 'government' and 'college' websites - reporting respectively 60% and 43% - would lower the overall average considerably. Incidentally, other work on university and college websites [Kelly 2002; Rowland & Smith 2000] reports similar levels of accessibility to the Jackson-Sanborn et al. [2002] college genre. More specific research outside of the public / public-affiliated arena is less encouraging. Murphy [2002], evaluating 17 UK high street banks found almost all failing on accessibility. These figures are mirrored in research by Williams and Rattray [2003] and Williams et al. [2004] reporting only 17% of UK-based accountancy firm websites and 10% of UK-based hotel websites Priority 1 accessible for surveys undertaken in 2002 and 2003 respectively. These very low figures are mirrored in the work of Davis [2002] testing web-based health information resources and also later in the work of Loiacono and McCoy [2004] where only 4 of the 44 websites drawn from eight genres were found to be Priority 1 accessible. Research by Coonin [2002] on 11 major electronic journal research service providers, verified with JAWS, found only one of the websites to be fully accessible. Beyond this limited statistical work, Howarth [2002], using blind and visually impaired respondents to provide a qualitative evaluation of four web-based online resources, still found notable access difficulties. For example, the illogical placement of links, buttons or edit boxes, inadequate labels and the use of frames were three of the aspects reported making the databases difficult to use.

#### 4. The Second Information Dimension – Meeting Informational Needs

The first objective of this work sets out to assess the level of accessibility in relation to hotel accommodation websites. However, whilst accessible information is a laudable goal in its own right, as this alone will benefit many individuals, including those who may simply face barriers for technology reasons rather than disability, impairment or condition, having information about the facilities and services available that meets the needs of individuals is also important. Importantly, it should be noted that individuals with disabilities or impairments will often require specific information regarding the facilities or services available. For example, an individual using a wheelchair may need to know door width dimensions and the extent of ramped access to facilities. The second objective of this work therefore sets out to assess whether the informational needs of disabled and impaired users are being met.

Two useful concepts that set out to explain consumer information search processes are involvement and the Elaboration Likelihood Model [Petty & Cacioppo 1981; 1983]. Simply stated, the type of information consumers seek, as well as the time, effort and cognitive resources they will dedicate to this, depends on their level of 'involvement' in the decision. According to the model, highly involved consumers are likely to follow a central route to decision making, drawing on or requiring rich, detailed information that enables them to evaluate options. By contrast, consumers who have a low degree of involvement are seen to follow a peripheral route to decision making, relying more on intuitive, emotional decision-making short-cuts.

The degree to which consumers become involved in the decision-making process is seen to depend on the perceived risk, be it financial, social, or related to self-image and the ego [Bitner & Obermiller 1985; Jacoby et al. 1972] and the personal relevance of the decision. The hypothesis here is that for many disabled and impaired tourists the decision to book a hotel room is one of high personal relevance, and one in which specific details (such as door dimensions) may confer a greater potential for risk – and thus a higher degree of perceived risk - on at least one, if not all, of the dimensions outlined above. As highly involved consumers, disabled and impaired individuals will therefore need to elaborate, to seek out specific information in line with Petty and Cacioppo's [1981; 1983] central route to decision making. In the travel (hotel) market this requirement for specific information is perhaps

compounded by the fact that a citizen of one country travelling to another may not be familiar with overseas legislation mandates in terms of disability accommodation, or indeed know what various local third-party logos indicating 'disability friendly' status mean. Further, they may have little or no knowledge as to the reliability of these trust seals. As such, many will search the website for specific information. Moreover, to re-iterate the first part of this paper, the website must not have barriers preventing them from accessing this information.

In summary, given the competitive, legal and technological mandates for accessibility, this work sets out to determine the level of accessibility currently provided by Australian, UK and US-based hotel websites. However, acknowledging the fact that it is not just *access* to information that is important in information processing, this work sets out to measure another important dimension to information – specifically, the work sets out to assess the extent to which the information provided on websites meets the needs of disabled travellers seeking to book a hotel in any one of the three locations.

## 5. Methodology

### 5.1 Assessing Website Accessibility Provision

In line with much of the previous accessibility research reported to date which tends to utilise the most well-known accessibility evaluation software, "Bobby" (<http://bobby.watchfire.com>), the Bobby software was utilised to record WCAG checkpoint compliance at Priority level 1. This software works by conducting an automated examination of various aspects of a website's programme coding, scoring compliance against the different checkpoints at the different priority levels. However, it should be noted that the software is unable to assess a website against all of the WCAG. For example, it can assess the presence of alternative text for a graphic or image, but it cannot assess its usefulness. Thus, if the alternative text alongside an image read simply "graphic" this would provide little use to the individual using a screen reader who needs that important context information. As another example, images may be used as spacing devices in a webpage's programme coding. If the alternative text read simply "image", the individual using a text-based browser would not know this. It may leave them in some doubt as they might expect it to contain content. However, whilst Bobby may be limited in this way, the software has two notable advantages to counter this deficiency. Firstly, it allows a large sample to be consistently processed [Hackett et al. 2005]. Secondly, if a site fails on one of the automated Bobby software checks it is also likely to exhibit the other, often more complex, errors the software cannot report on [Williams & Rattray 2003].

Addressing the limitation that the Bobby software cannot provide a comprehensive assessment of accessibility, one additional manual user check of the websites was undertaken. For those websites that did, in fact, provide alternative text for graphics or images, technically 'scoring a pass' for Priority WCAG 1.1 by its presence (Table 1), the quality of this alternative was assessed. That is, did the alternative text provide the important context information to enable an individual to process it without seeing it? Here, two independent researchers assessed the usefulness of the equivalent alternative text associated with the graphics and images utilised on the web pages. In addition to the example of the alternative text tag, `alt=""`, being used for images used for ornamental reasons or as spacing devices, a further example of the importance of useful equivalent alternative text can be highlighted with the example where an image on a webpage *has* the equivalent alternative text "picture". On the Bobby software check this alternative text would pass the Bobby assessment, but if that image is important for the comprehension of the content of the page, or for navigation (e.g. an arrow pointing to some link), then the equivalent alternative text would in fact need to be more than merely the word "picture". It will need to describe that the image directs attention to a link on the page. Any anomalies in the researcher assessments were moderated by a third researcher.

The automated Bobby software check, as well as the manual users checks performed by the researcher, were undertaken on the homepage (entry page) to the hotel-accommodation website, as well as the first and second logical links from them, rather than on the whole site. This was driven in part by practicality, given that the number of pages linked from the homepage is frequently extensive, but also from the fact that research indicates accessibility levels of the homepage to be approximate to those of subsequent linked pages [Williams & Rattray 2003]. As the homepage is, in any case, the page most individuals enter into a website, forming their first impressions and generating their initial experiences, it is also perhaps the most important.

A total of three hundred hotel-accommodation sites comprising one hundred based in each of Australia, the United Kingdom and the USA were initially selected for the Bobby and manual assessments. To obtain a representative sample for each of the countries, websites were selected from search strings that included a city name (starting with the most populous and selected on the basis of a weighted average of the country's population; each city constitutes a major tourist destination, appealing to a broad range of travellers, that might be expected to have a well-established tourism infrastructure and provide accessible accommodations for all) and "hotel" entered into the search engine 'Google'. For example, in the case of the UK the first search string used was 'London and hotel'. Weighting the sample for each country in this way helped to ensure that the sites better reflected a country rather

than one particular region within it. Using a city name and hotel in the search string the sample drawn comprised individual hotel sites, central booking sites for chains and third-party booking agencies.

## 5.2 Assessing the Provision of Information

Hotels might accommodate the needs of individuals when it comes to accessing the content (the information) on the website by conforming to the various checkpoints given in the WCAG, however barriers may then exist for disabled consumers in terms of the detail of information about the accommodation itself. To evaluate potential barriers that may arise from a lack of information on the website about the accommodation facilities and services provided at the hotel a detailed 'Framework of Information Requirements' needed to be developed. This framework was developed from criteria obtained from a range of relevant disability stakeholders including the Disability Rights Commission, The English Tourist Board, The Disability Discrimination Act, Disability Go, Good Access Guide Ltd, Accessible Travel, Accessible Leisure Solutions, and Tourism For All (Appendix 1). Utilising a wide range of sources to construct the information requirements checklist ensured that the assessment tool was comprehensive enough to span most forms of disability needs.

Utilising the Framework of Information Requirements and selecting a second random sub-sample of 40 sites from each of the 100 Australian, UK and the US sites initially selected, two assessors independently: (1) reviewed the homepage; (2) navigated to and reviewed any internal links within the site labelled as specifically relevant to disabled tourists; (3) navigated to and reviewed internal links related to hotel facilities or amenities; and (4) searched the site for the key words 'disability' and/or 'disabled', navigating to and reviewing any results returned. To be clear, the framework's intention was not an attempt to assess the actual facilities of the hotels. Rather, it was designed to assess whether any information was provided on websites that might meet particular needs (coding it as either yes for have or no for have not).

As many of the sites in this sub-sample were third-party booking agencies and as such might not be expected to carry the detailed information required by disabled travellers, a third sample was generated that contained actual hotel sites only. To obtain this third sample, 10 booking agencies were randomly selected for each country and from each of them two three-star, two four-star and two five-star rated individual hotels were selected. The third 180 hotel website sample therefore contained 60 hotels (20 three-star hotels, 20 four-star hotels and 20 five-star hotels). Quota sampling in this way enabled a further question to be addressed. That is, if the quality of information related in any way to the quality of hotel as judged by its star-rating.

## 6. Data Findings

Reviewing the 300 sites (100 from each country) initially selected for evaluation revealed several duplications in each of the country samples (e.g. some booking agency sites appeared twice in each country sample – once under one city and once under another). Removing these to avoid double counting, 7 Australian sites (8% of the Australian sample), 19 UK sites (20% of the UK sample) and 5 US (6% of the US sample) conformed to the Priority level 1 WCAG the Bobby software was able to assess compliance against (Table 3). Incidentally, of these sites, 1, 3 and 1 respectively also passed the Priority 2 WCAGs, with 0, 1 and 0 respectively going further and passing the Priority 3 WCAG).

Of the sites failing the Priority level 1 WCAG assessed by the Bobby software, 52 Australian sites (63% of the Australian sample), 51 UK sites (53% of the UK sample) and 49 US sites (61% of the US sample) failed only one of the Priority level WCAG. Subsequently, only 27 Australian sites, 28 UK sites and 26 US sites failed with two or more Priority 1 WCAG errors. This concentration of failures against Priority 1 checkpoints contrasts with the more robust accessibility WCAG of Priority 2 and 3. Here, at Priority level 2, 66 Australian sites, 73 UK sites, and 62 US sites recorded three or more WCAG failures. This picture is similar at Priority level 3 with 73 Australian sites, 74 UK sites, and 63 US sites recording three or more WCAG failures.

Table 3: Sites Passing (Bobby) Priority 1 Checkpoints

	No. of Sites Passing at Priority 1
Australia	7 (8%)
UK	19 (20%)
USA	5 (6%)
Overall	31 (12%)

**Notes:** Original 300 sample reduced to take account of duplicate sites. Remaining sample comprised Australian; n = 83; UK; n = 97; US; n = 80. Total sample; n = 260.

Analysis of the 52 Australian, 51 UK and 49 US sites evaluated by Bobby as recording only one WCAG Priority Level 1 failure reveals that the dominant checkpoint failure was a 'Failure to provide alternative text for all



images'. Indeed, 94% of the Australian sites, 92% of the UK sites and 90% of the US sites failing against a single checkpoint, failed for this reason. By comparison, the remaining reasons for failure (save perhaps 'Failure to give each frame a titles'), appear largely insignificant (Table 4).

Table 4: Analysis of Sites Recording a Single (Bobby) Priority 1 Checkpoint Failure

	<b>Australia (n=52)</b>	<b>UK (n=51)</b>	<b>USA (n=49)</b>
Failure to provide alternative text for all images	49 (94%)	47 (92%)	44 (90%)
Failure to provide alternative text for all image type buttons	1 (2%)	0 (0%)	0 (0%)
Failure to give each frame a title	1 (2%)	3 (6%)	5 (10%)
Failure to provide alternative text for all image hotspots	0 (0%)	1 (2%)	0 (0%)
Failure to provide alternative text for all image map hotspots	1 (1%)	0 (0%)	0 (0%)
Failure to ensure every frame references an HTML file	0 (0%)	0 (0%)	0 (0%)

Whilst the Bobby software provides a good indication of the general accessibility of sites, manual user checks are required to provide a more comprehensive assessment of sites' accessibility. In this regard, assessing the quality of the alternative text for pictures, images, graphics etc. (important for those using devices such as text-based browsers or screen readers who do not "see" the picture or image) on those sites that passed the WCAG at Priority level 1, revealed that of the 7 Australian sites, 3 provided alternative text describing the content of the image, but failed to indicate the type of image. Two of the sites provided alternative text, but the content of this text provided no relevant information about the image. Of the remaining two sites, one site provided useful (equivalent) alternative text and the alternative text also indicated the type of image, whilst the other site contained no pictures but had an image button. Here the alternative text for the image was not useful. A similar picture was obtained from the analysis of the UK and US sites.

Against the Framework of Information Requirements developed from a range of disability related sources, very few of the second (sub) sample of the 120 sites (40 from each country) provided any of the detailed information likely to be required by disabled tourists. Indeed, information relating specifically to disabled travellers was provided by only 3 Australian, 1 UK, and 3 US sites. This information was typically limited to a general statement of accessibility, for example; 'disabled access' or 'disabled (or handicapped) rooms/facilities'. Just one (US) website provided information that might be considered as meeting the specific needs of disabled / impaired travellers: "Sophisticated fire safety system, including smoke detectors / alerts for hearing and visually impaired guests, Brailled elevator and guest room signage, TDD telephone display and television tele-caption decoders for the hearing impaired are available."

Considering the third sample comprising 180 hotel sites (60 sites from each of the three countries) which worked to eliminate the effect of booking agencies on the findings, the results were found to improve marginally. Indeed, 25% of the sample did provide some information, although, again, it was generally little more than a broad statement such as 'disabled facilities', 'handicap accessible' or 'disabled access'. Very few, for example only two of the Australian sub-sample, sought to clarify general statements, making specific reference to, for instance, 'rails in bathrooms, 'wheelchairs available and 'Brailled lifts'. Overall, no significant differences were to be found between the quality (star) ratings of hotels and between the different countries.

## 7. Discussion

Information is particularly relevant for tourist consumers given that 'without it the motivation and ability to travel is severely limited [O'Connor & Frew 2002]. Internet-based technologies (principally the web) offer new possibilities for both consumers and organisations to share this important commodity, information. However, for one notable group - disabled and challenged individuals - there are barriers to the access of online information, just as there are frequently barriers in the 'traditional' (physical) environment. Accommodating the diversity of needs and capabilities of disabled and challenged individuals is important therefore if both parties are to be able to reap the potential rewards offered by the technology.

With only 8%, 20% and 6% of Australian, UK and US-based hotel-accommodation websites sampled passing the minimum *de facto* WCAG Priority 1 standards that can be assessed by Bobby, the findings of this research are disappointing both in absolute and relative terms. In absolute terms, the low Priority 1 pass rates reveal that a significant number of individuals will face barriers accessing the information on a majority of hotel sites. This is a problem not only for disabled and challenged users, but also for other groups who indirectly may share the need for accessibility. For example, given that a clear majority of any of the different countries' websites failed to provide

alternative text for images, graphics, etc. and, moreover, even those that did provide alternative text failed to provide *useful* alternative text, the sites present difficulties for those using screen readers. However, they also present barriers to those who are not disabled but choose to view websites with text-based browsers.

In the minority of cases where alternative text was provided alongside pictures, images, graphics etc. the alternative text was largely ineffective in conveying equivalent meaning. This is disappointing, but also presents a further point of interest. If alternative text is being provided, but is failing to meet the needs of individuals who may use it, it seems that the lack of an understanding of the needs of disabled and challenged individuals is greater than the initial percentages for Priority 1, 2 and 3 pass rates suggest.

In relative terms, the results are disappointing in the sense that the critical issue of accessibility appears to have not just been missed by a single country, but by all three, although the UK fares better than Australia and the US. Indeed, the difference in overall performance (considering Bobby and manual assessments) of the three countries against the *de facto* standards is arguably negligible. Moreover, as the three countries surveyed represent perhaps three of the more mature internet economies, it might be hypothesised those higher levels of accessibility will not be found elsewhere. The findings here are also disappointingly poor in another relative sense. Given that information is the 'lifeblood' of tourism, important in the motivation and ability to travel, and that the industry is both particularly suited to the technology [Wynne et al. 2001] as well as an early adopter of technology, the accessibility levels found here are low, relative to other comparable accessibility results (for example, the Jackson-Sanborn et al. [2002], Lilly and van Fleet [1999], Craven [2000], and Loiacono and McCoy [2004] surveys). Moreover, these other survey results, as well as those to which the results here are comparable, are based on assessments made considerably earlier back in time. Whilst a reasonable expectation here might be that the passage of time would have improved more recent survey results, in fact it has not, a point also noted in the recent results of a random sample of non-governmental websites [Hackett et al. 2005].

Poor accessibility may be attributed, of course, to unwillingness on the part of web designers to make their pages accessible in the belief that this will detract from the quality of the design and/or increase the costs involved in publishing a website. It might additionally be attributed to the progressive complexity of websites. However, as the literature illustrates, unwillingness based on at least two of these factors - cost and quality - is largely erroneous. For example, Davis [2002] and Guitierrez et al. [2005] both illustrate higher pass rates at Priority level 1 can be achieved with relative ease. Moreover, whilst the survey of Hackett et al. [2005] reported non-governmental websites becoming progressively inaccessible, this finding was not mirrored in governmental websites. In terms of quality, the earlier example of the graded-sidewalk serves as a reminder that good design is frequently good for all. A good accessible website need not therefore detract from the experience of those who do not obviously face accessibility issues.

Poor accessibility may additionally be attributed to ignorance on the part of the web designer and the organisation commissioning the web development about the actual needs of the disabled and impaired as well as those barriers some may face simply for technological reasons. It might also be attributable to ignorance about the competitive, legal, and technological benefits of meeting the needs of the disabled. In the case of the former, the lack of alternative text, and moreover the poor quality of the alternative text when it was provided, suggests that designers do not consider the alternative ways many individual process information on the web. For example, there may be a misconception about how text to audio technologies work and what they can do for the user. Even the very best end user technology needs appropriate design coding for it to be able to identify for the user what that design means. For example, audio to speech devices need alternative text to describe the content of the image or merely mark it as a spacing device that can be ignored. Indeed, in the case of FLASH or Java Applets where there is no alternative text, these parts of the web page will vanish from the text only version of the site, at best leaving the individual confused.

In providing motivation and ability to travel, the quality of information provided is, perhaps, just as important as access to it. Indeed, one can logically conclude that, for disabled and challenged users, the perceived risk (and indeed the likely actual risk) of travelling and staying in unfamiliar environments is high. With high risk, high involvement decisions, individuals seek elaboration both in terms of information search and information processing. For example, a mobility impaired individual may require information about parking and/or ramped access, access to rooms, entertainment, etc. Against the Framework of Information Requirements developed from criteria obtained from a range of relevant disability stakeholders the majority of the websites surveyed failed to provide this type of information. Indeed, overall, there was little opportunity for elaboration in what for disabled consumers is likely to be a high involvement decision. Moreover, this was found to be the case whether considering booking agency sites or hotels of whatever star-ranking. Whilst disappointing, this finding may be explained by the fact that any one website can only contain so much information (although this ignores the size of this group in society). This finding might also be explained if alternative means of elaboration were provided. That is, if organisations responded to

direct requests for information (via email); an interesting issue for future research. Whether or not the hotels had accommodation and services that met the needs of the disabled would of course have been interesting, and is important in the consumption decision, however, for the purposes at hand here, this is another question. The question here was merely whether or not the disabled consumer could find out about the accommodation and services.

In presenting the results of this research it is useful to note the development in internet technology of XML (Extensible Markup Language) which will make automatic conversions of content for alternative display easier. However, whilst this programming language offers advantages over HTML, it is interesting to note that none of the sampled websites actually used XML programming. This is in spite of the emergence of softwares that will help programmers 'automatically' convert HTML programming codes. It also needs to be noted that the use of XML provides no intrinsic guarantee of the accessibility of the applications it enables (<http://www.w3.org/TR/xag> Accessed 24.04.06). Indeed, the freedom of design enabled with XML may result in a loss of accessibility features because of the pervasive presence of HTML programming language [Dardailier 2006]. Fundamentally, whether HTML or XML programming languages are used, an understanding of the particular needs of disabled users is still important, something the results here demonstrate is some way off from being achieved.

In considering how the findings and implications of this study may be relevant for industries other than the hotel industry, a few points are noteworthy. First, access to information is relevant for all industries. Irrespective of product or service type the consumer invariably requires access to some information in the decision-making process. For example, it does not matter if it is a hotel, a CD, or an airline ticket, the consumer needs to be able to obtain information. Regarding access to information this is a requirement for all industries. By way of contrast, the need for detailed information and an ability on the part of the consumer to elaborate may be industry specific. One unique characteristic of the hotel type product is that once the consumer is committed to it (i.e. it is purchased) it is often difficult to reject and find equivalent and appropriate alternatives. For example, arriving to check-in in a strange city at, say, 11.00 pm, the ability to seek alternatives and reject the prior choice is problematic and inconvenient, perhaps even more so for a disabled individual. This means that detailed information is a pre-requisite for consumers of products with this (high involvement) characteristic. Thus, beyond the hotel industry, other industries considering the detail of the information they provide directly on their websites and/or in response to customer requests need to consider the level of involvement of their consumers.

Beyond possible industry effects a second question is whether there are likely to be any cultural considerations about webpage design and accessibility. Following industry considerations, access to information is relevant for all. However, about the structure of that information and indeed the nature of it there may well be cultural effects. For example, Hofstede's cultural dimension 'uncertainty avoidance', which describes the extent to which members of society tolerate uncertainty and ambiguity (see for e.g. Hofstede, 1997), has been interpreted in terms of the web as possibly linked to risk taking [Cook & Finlayson 2005]. The need for information may therefore be cultural. In other words, the level of involvement felt by the individual and the need to elaborate may be different for individuals from different cultures. The question of whether these possible cultural influences override the specific need for information for disabled individuals remains however to be explored.

## 8. Conclusion

The number of disabled and impaired individuals in society provides a strong competitive mandate for organisations to meet their differing needs and capabilities. Indeed, in recognition of their particular needs and capabilities, as well as their disposable income to spend on tourism, this group have been identified as the next consumer niche [Prager 1999]. However, beyond the mere economics of meeting the online accessibility needs of the disabled and impaired, two further mandates exist for organisations to consider their needs. Indirectly, the access needs of disabled individuals are also the needs of other groups in society. In this respect, there is a general technology mandate for accessibility as information is not platform independent - a fact that could affect any member of society for any number of reasons. For example, accessible design enables low technology to access high technology, and allows individuals who are illiterate to access the web because screen readers can audibly read the text out loud, just as it allows an individual using a text-based browser on a WAP PDA to download websites quickly, etc. Finally, in addition to competitive and technological mandates, a legal mandate for online accessibility is emerging. Simply, access to information also involves access to opportunity. Indeed, recent evidence suggests that providing accessibility will not be a matter of choice, but a compliance issue. For the tourism industry, and more specifically the hotel sector, the results of this research show little acknowledgement of these three mandates, even when judged against the minimum WCAG Priority 1 *de facto* standard.

Focussing merely on accessibility for the disabled is however not enough. The information accessed must also meet their needs. In this respect it must recognise the perceived risk that individuals with particular needs might face

in the hotel accommodation situation. In doing so it should therefore allow them to elaborate. For the tourism industry, and more specifically the hotel sector, the results of this research show little acknowledgement of the likely online informational needs of disabled individuals. Overall, there is clearly much work to be done in meeting the online needs of disabled tourists.

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## APPENDIX I

<b>1. Generic information for all disabled tourists</b>
<b>1.1. Pre-arrival services</b> Met at the train station/airport/bus station/etc. Transport to and from hotel to connections Taxi booking service
<b>1.2. On-arrival services</b> Assistance with bags on arrival Escort to room Guided tour of facilities Emergency and evacuation procedures
<b>1.3. During your stay</b> Disabled car parking Transport to and from local attractions Specialist equipment available in-house (e.g. emergency assistance buttons, medical equipment, etc.) Ground floor rooms available where required Accessible entertainment in-house (e.g. bars, dancing, dining, live shows, etc.) Accessible excursions/activities arranged or provided
<b>1.4. Specialist staff skills</b> Medical Access and facilitation Undertaken disability equality training Resolving problems and disputes
<b>2. Specific information for visually impaired tourists</b>
<b>2.1. During your stay</b> Guide dogs welcome Facilities for guide dogs Assistance with dining facilities where required (e.g. personal assistance with self-service dining, arrangements to serve at table, escort to chair, etc.) Table service available in bars and restaurants Specialist in-house entertainment (e.g. live music, audio shows)
<b>2.2. Information communicated in alternative formats</b> Large print Braille Audio Décor (e.g. colour coding to help route finding, contrast door frames with surrounding walls, steps distinguishable through contrasting brightness, avoid all-white finishes in bathrooms, coloured towels, coloured stickers on glass doors) Coloured coded crockery, glassware, serving dishes, etc. in restaurants/bars Personal explanation (e.g. location of facilities and room layouts, controls for equipment, etc.)
<b>2.3. Appropriate signage</b> Contrasting colours Clear print Non-reflective Well-lit Accessible height
<b>3. Specific information tourists with mobility impairment</b>
<b>3.1. During your stay</b> Availability of all facilities (i.e. are all facilities available to wheelchair users?) Location of facilities (e.g. ground floor, close proximity, no obstacles, etc.) Access to facilities (e.g. space to manoeuvre wheel chair, ramps, low reception desk, all controls at accessible height, blocks available to alter height of beds, etc.) Assistance with dining facilities where required (e.g. personal assistance with self-service dining, escort to chair, etc.)

Table service available in bars and restaurants Specialist equipment available in-house (e.g. swimming pool lift, wheel chair hire, etc.)
<b>4. Specific information for guests with limited dexterity</b>
<b>4.1. During your stay</b> Provide specially adapted crockery and cutlery Large buttons on controls and telephones
<b>5. Specific information for tourists with hearing difficulties</b>
<b>5.1. During your stay</b> Induction loops/visible loop symbol Text phones Visual telephone alerts Visual or vibrating emergency alarms Accessible entertainment (e.g. subtitles for films, signer for live shows)
<b>5.2. Information communicated in alternative formats</b> Visual text and imagery Sign-language Subtitled videos Teletext and Ceefax TV