

# The Relationship between Information on Websites and Customers' Attitudes

— Log Data Analysis of an Experimental Medical Institution Website —

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The purpose of this study is to survey the utilization of medical institution websites by customers and assess their attitudes. This study used an experimental website to obtain log data of customers' information searches, surveys on their attitudes, and questionnaires to evaluate how the website influence the evaluation of the actual medical institution. Customers' evaluation of the website affects the evaluation of the actual medical institution and the intention to make an appointment at the institution. Objective information has a more positive effect on customers' memory and the evaluation of medical institution websites than subjective information.

**Keywords:** Internet, Attitude, Subjective Information, Objective Information, Web Marketing

## I. Introduction

According to the 2015 White Paper "Information and Communications in Japan"<sup>1)</sup>, information and communication technology (ICT) use and applications are spreading across generational boundaries. For example, comparing the Internet usage rates by age group between 2002 and 2014 shows that the usage rates ascend in all age groups, and the increase has been particularly pronounced among seniors 60 and older. The Internet has had major impacts on four existing media: television, newspaper, radio, and magazine<sup>2)</sup>. People can access the Internet on various devices such as a PC, mobile phone, smartphone, tablet, television, or game console.

The release of the iPhone in 2007 and other smartphones have made access to information on the Internet easier. "Communications Usage Trend Survey in 2013" shows that smartphone growth has been prominent in the under-60s age groups. Conventional mobile phones have declined markedly in the under-40s age groups. Internet usage in the 13 to 59 cohort has exceeded 90 percent, while internet usage in the 50 to 69 cohort has been expanding<sup>3)</sup>. This trend has increased the necessity not only for companies but also for nonprofit organizations such as those focusing on education and medicine to engage in active marketing communications via websites.

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Nonprofit organizations' websites are browsed by a diverse set of users. For example, university's official websites are visited not only by existing students, faculty members, and graduates but also by prospective students and their parents, local residents, and companies looking to establish a partnership. Thus, each has different needs when visiting the website. Similar to university websites, medical institution websites are viewed by prospective patients, patients, patients' families and friends, related businesses, employees, and people looking for employment opportunities. For nonprofit organizations, websites play an important role as a marketing communication channel for various stakeholders.

Nonprofit organizations actively use websites for many reasons. One is the popularization and the frequent use of the Internet among customers. Other compelling reasons are that nonprofit organizations face strict advertising rules and restricted marketing communications.

In Japan, the Medical Service Law specifically regulates advertisements by medical corporations. As a general rule, medical advertisements are prohibited except for specifically authorized subjects and to protect patients. However, the deregulation trend since 2000 has changed this situation. A law amendment in 2002 set forth that one of the pillars to enhance the quality and efficiency of medical services in Japan is to allow patients to select services. The amendment in 2007 allows objective and accurate information to be widely advertised in an effort to realize quality, safe, and secure medical services. The Guidelines for Medical Advertising considers flyers, pamphlets, posters, and billboards to be advertisement, whereas listed notices within a hospital, advertisements for staff openings, articles in newspapers and magazines, academic papers, and websites are not considered advertisements.

In short, websites are highly flexible media that can distribute information without being restricted by advertisement regulations. Ikari <sup>4)</sup> reported that medical institution websites provide loopholes from advertisement regulations; between 2000 and 2002, websites were actively set up and launched when advertisements were deregulated. Since then their quality and quantity have tremendously increased.

Although the Ministry of Health, Labour and Welfare (MHLW) continues to exclude websites from restricted media as a general rule, it has developed a policy on the appropriate content of medical institution websites. The Ministry concluded in the Report of the Reviewing Committee on Medical Information Provision (2012) that medical institution websites were regarded as properties very similar to advertisements under the Medical Service Law because information distribution on the Internet has become universal, information is easily available to citizens and patients on computers and mobile phones, and there is an increasing number of cases in which Internet users are guided to browse medical institution websites regardless of their intentions as a result of following links on illnesses and health.

However, with regard to the discussion whether medical institution websites are considered advertisements under the Medical Service Law, the Ministry also states that websites have a dual nature of

advertising and sharing information. This information can express the philosophy and characteristics of a medical institution, share local activities, and highlight cooperation with other medical institutions. In other words, customers sometimes recognize nonprofit organization websites as a venue to provide information on the services delivered by the organization. Thus, nonprofit organization websites are media with an advertising aspect as well as a source for other types of information.

Although there are many studies on the quality of information, accessibility, and medical advertisement regulations of medical institution websites, few focus on the customers' attitudes towards websites. Therefore, the relationship between customers' attitudes towards medical institution websites and actually making an appointment needs to be studied when medical institutions utilize websites as a marketing tool.

Medical institution websites are media for patients to collect vital information that also functions as advertisement. Because websites play an important role when patients are selecting the appropriate medical institution, the following two points must be considered in web marketing strategies of medical institutions: diverse users and minimizing costs. The website must be responsive to a wide range of users because even those unfamiliar with website browsing such as people with special needs and elderly people may be using the website. Thus, the format should allow anyone to easily obtain the desired information regardless of his or her ability or condition. Since medical institutions do not have unlimited marketing budgets, they must provide websites at a minimal cost while gaining patients' trust and garnering positive feedback.

Traditionally, medical institution websites have provided useful information for people with specific needs. However, such websites have recently shifted to ensure not only information disclosure but also interactive communications and branding. This may be due to the increased recognition that websites have a positive impact on customers' attitudes in modern society. What types of information positively impacts patients' attitudes have yet to be determined.

To elucidate the effectiveness of website promotion of medical institutions, the purpose of this study is to survey the utilization of medical institution websites by customers and assess their attitudes. This study uses an experimental website to obtain log data of customers' information searches, surveys on their attitudes, and questionnaires to evaluate how the website actually influence the evaluation of the medical institution.

## **II . Website as a Touchpoint**

### **1 . Customer Experience on the Website**

Previous studies on service marketing have examined customers' experiences from different perspectives. In service marketing, emphasis has been placed on the importance of setting the customer experiences by

engaging in the service delivery process over a certain period, which includes the customer's perceived quality.

Customer experience is defined as the development of a company-customer relationship<sup>5)</sup>, including interactions with customers at all touchpoints and moments of contact. Customers evaluate various factors when experiencing services to form their attitudes towards the services and the institutions that deliver them. Here, experiences include those obtained from the service as well as those from touchpoints such as websites. Consequently, websites have critical meaning in the context of marketing.

Since 2000, many studies have measured customers' attitudes on the web. Barnes et al.<sup>6)</sup> performed an experimental study on book sales on the Internet, and pointed to *WebQual* as an effective tool to measure the perceived quality of e-commerce. Their evaluation index introduced five concepts: usability, design, information, trust, and empathy. Similarly, Wolfinbarger et al.<sup>7)</sup> introduced *eTailQ*, which involves four factors that influence the evaluation of quality: website design, fulfillment/reliability, security/privacy, and customer service. Thus, there are multiple standards to evaluate electronic interfaces that can also support future studies.

In addition to the problem of the index, the assessment of attitudes is discussed. With regard to studies on hospital websites, the lack of customer orientation can cause patient needs to be unsatisfied, reducing the customers' perceived image and reliability of the hospital<sup>8)</sup>. Some studies found that website experiences influence the level of satisfaction and trust. Three perceptions of websites (information content perceptions, navigation structure perceptions, and graphic style perceptions) and two customer evaluation factors (online channel service quality perceptions and security risk perceptions) influence online channel use and overall satisfaction<sup>9)</sup>. In other words, website design and information influence customers' cognition after viewing.

The way in which customers form attitudes may depend on their experiences and learning. The importance of credibility supported by expertise and reliability as a means of effective and persuasive communication has been highlighted.

While some studies have investigated the quality of information, accessibility, and advertisement regulations with regard to nonprofit organization websites, few have focused on customers' attitudes towards websites. Given the assumption that nonprofit organizations will increasingly utilize websites as marketing tools in the future, a study on customers' attitudes towards websites and their behavior has great importance.

## 2. Websites in Healthcare

In recent years, more and more medical institutions have websites that allow users to learn about the

availability of services, vaccinations offered, appointments, rescheduling procedures, and waiting times. The development of ICT has shifted the method of communication from the communication based on telephone calls and post mail to one based on websites, allowing a quicker and broader distribution of information. Websites not only deliver information, but also provoke interactive communications and create a venue where visitors can take real-time actions and contact the institutions.

There are several guidelines regarding the advertisement in Internet for healthcare information providers. After the Japan Medical Association published "Guidelines for Medical Institution Websites and Provision of Healthcare Information" in 2005, the advertisement regulations were revised in Japan's Medical Service Law in 2007. On the global level, "The HON Code" published by the Health on the Net Foundation (HON) sets (1) authoritative, (2) complementarity, (3) privacy, (4) attribution, (5) justifiability, (6) transparency, (7) financial disclosure, and (8) advertising policy as their foundational rules.

Earlier studies on medical service websites observed the following. Customers consider physicians (61%), pharmacists (16%), and medical information websites (13%) as trustworthy sources of information<sup>10)</sup>, indicating that medical service websites have a trust level comparable to pharmacists. In addition, physicians (84%), pharmacists (54%), and medical information websites (49%) are sources of medical information, showing that the cognition of medical service websites are similar to that of pharmacists. Thus, customers have a certain level of trust in websites for their medical services. Who performs the information search on medical institution websites is also important. Women tend to use medical service websites more frequently than men when gathering information on medicine<sup>10)</sup>.

Some studies have examined trust in websites for healthcare services. Gummerus<sup>11)</sup> argued that trust effectively increases customers' willingness to rely on service provider, reducing the perceived risks when actually using the service. Trust is also considered a positive feedback of an online service and customer loyalty. Bliemel et al.<sup>12)</sup> found that satisfaction with system quality actually played a larger role in determining overall consumer satisfaction than satisfaction with information quality. This leads to the recommendation that operators of health information websites place at least as much emphasis on the design and usability of their websites as they do on their content quality.

Klein<sup>13)</sup> performed a survey on online physician-patient communication applications for a patient's first visit and found that the perceived effectiveness as well as trust in medical institutions and service providers influence patients' behavioral intentions, motivating certain behaviors. Gallant et al.'s<sup>14)</sup> study on hospital websites argued that trust, credibility, usefulness, and personalization are important factors when customers use hospital websites.

Because services are created through collaborations between service providers and customers, motivating customers to participate continues to be a major challenge. Service providers make efforts to

encourage patient participation, which is related to the physical surrounding and the setting of the provided service. Bitner<sup>15)</sup> describes that the servicescape can assume a facilitator role by either aiding or hindering the ability of customers and employees to carry out their respective activities. As a facilitator, the servicescape can also encourage and nurture particular forms of social interaction among and between employees and customers. The physical surroundings influence behavior and can remarkably enhance professional services. Websites are part of the surroundings related to medical services and may help encourage patient participation.

Mar et al.<sup>16)</sup> argued that desirable communications improve patient outcomes. If trust and satisfaction by marketing communication on a website are improved, patients may be encouraged to visit physicians, which may enhance patient outcomes.

Donabedian<sup>17)</sup> argued that the quality of medical care is due to the nature of the medical care unit and patient's assessment of it, and that medical care consists of an interpersonal aspect and a technical aspect. Medical service websites need to provide information from both interpersonal and technical aspects. This author conducted research to elucidate the relationship between the level of patients' satisfaction with the medical service as a whole and their satisfaction with physicians<sup>18)</sup>. Satisfaction with physicians was at the core of satisfaction with medical services as a whole, and satisfaction with physicians and overall satisfaction were highly correlated. Thus, information that helps patients evaluate physicians should influence the evaluation of websites.

However, few studies have discussed customers' evaluation of information about physicians and interpersonal and technical aspects of medical services. Thus, this study measured customers' evaluations and their effects by the experimental site of a medical institution. Patients evaluate physicians with subjective qualities and objective qualities. Some patients prefer subjective aspects, while others prefer objective aspects<sup>18)</sup>. In this study, customers' attitudes were researched by a comparison of subjective information and objective information.

### III. Method

#### 1. Research Overview

This study provides information about the interpersonal aspect as subjective information and information about the technical aspect as objective information in the following three experimental websites and measures customers' evaluation on each:

Version A: The site has more subjective information and less objective information.

Version B: The site has more objective information and less subjective information.

Version C: The site has both subjective and objective information.

To control the information provided on each website, Version A introduces an atmospheric photo of the ocean on the main page. The second page contains emotional greetings from the hospital director along with photos of smiling staff members and personal messages from the staff (introduction of staff). The third page lists their services as a means to reduce patients' anxiety toward examinations and patient illnesses (information for patients). Version B shows photos of the hospital (interior and exterior) on the main page. The second page describes the history of the hospital, background of the hospital director, and the number of staff members and their qualifications. The third page provides examination costs and past achievements in treatment. Version C is a combination of Versions A and B.

All versions contain photos and qualifications of the hospital director on the second page, while the third page introduces medical examination procedures and photos of examination equipment. Table 1 summarizes the controlled information. All have Q&A, topics, hours, access, and appointment information on the fourth page. This study used a web-based experimental survey system, "Sen<sup>i</sup>)".

Table 1. Website types and controlled information (excluding information that is common in all versions)

	Version A	Version B	Version C
Page 1	-Atmospheric photo of the ocean	-Exterior photo -Interior photo	-Atmospheric photo of the ocean -Exterior photo
Page 2	-Director's greeting -Commissioned workplace -Staff photo -Message from staff	-Organizational history -Background of the hospital director and his/her affiliation with academic societies -Number of staff -Qualifications of staff	-Director's greeting -Commissioned workplace -Organizational history -Background of the hospital director and his/her affiliation with academic societies -Staff photo -Message from staff -Number of staff -Qualifications of staff
Page 3	-Description of examination methods -Description of illnesses	-Types and pricing of examinations -Achievement in examinations	-Description of examination methods -Types and pricing of examinations -Achievements in treatment, description of illnesses

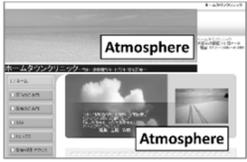
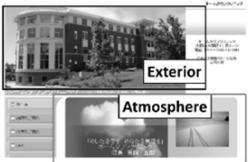
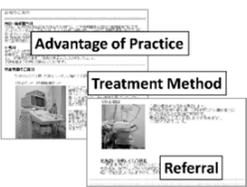
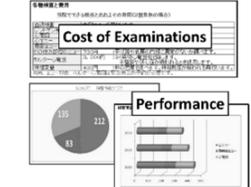
	Version A	Version B	Version C
1			
2			
3			

Fig.1. Controlling information in Versions A, B, and C

Research participants evaluated two of the three versions. To limit the influence of the first presented version on the second presented version, participants answered a survey about the first website immediately after viewing it. Then sufficient time was allotted before answering the questionnaire about the second website. During that time, they answered non-related questionnaires. Additionally, participants were divided into four groups, and each group had a different evaluation order to ensure that the viewing order does not affect the results (e.g., A to B, B to A, A to C, and B to C). Because Version C is a combination of A and B, it is regarded as the reference, which is the reason why there are fewer sample sets for Version C.

Participants were given the following scenario before the evaluation. “You are warned of a lifestyle-related illness during a health checkup and instructed to follow up with a medical institution. To determine which medical institution is best for you, you find this clinic during an Internet search. Please review the entire site before completing the evaluation.”

Data were collected about the paths used to browse the website, the total time spent on the website, memory of each page, and evaluation of the website. The relationship between search activity and customer attitudes was analyzed. Comparisons were made between heavy and light users of the Internet as well as between those with and without chronic illnesses.

## 2. Research Targets

The research was carried out on the Internet in December 2010 and January 2011 targeting 603 participants (30-87 years old) from the research company. The participants were divided into two groups based on Internet use (heavy vs. light) and the frequency of physician visits for chronic illness (regular/irregular).

Of the participants, the logs of 549 indicate that any of the three pages for the version were browsed (91% valid response rate), while the logs of 308 indicate that all three pages were browsed (51% valid response rate). Although each participant evaluated two of the three versions, log data were available for only one website in some cases. Thus, the number of samples that browsed any one of the three pages with controlled information was 1,045. Specifically, 838 samples browsed the main page, 904 browsed the introduction of staff, and 891 browsed information for patients.

This paper used samples with log data for browsing each page to evaluate the pages, while the samples with log data were used to analyze causal relationships of browsing for all pages. The log data for browsing Q&A, topics, hours/access, and appointment pages, which were the same in all versions, was used to calculate the total time spent on a page and the navigation distance. SPSS statistics 18.0 for Windows and AMOS 18.0 were used for all statistical processing.

The gender breakdown of valid responses was 280 male and 269 female respondents. Of the participants, 232 had a chronic illness and 317 did not. The age groups contained 126 people in their 30s (22.9%), 225 in their 40s (40.9%), 131 in their 50s (23.9%), 53 in their 60s (9.7%), 12 in their 70s (2.2%), and 2 in their 80s (0.4%). The number of valid responses for the three versions was 454 for Version A, 451 for Version B, and 140 for Version C. The grand total was 1,045. With regard to the evaluation order, 262 (25.1%) evaluated Version A first, 192 (18.4%) viewed Version A second. Similarly, 251 (24%) evaluated Version B first, and 200 (19.1%) viewed Version B second. Finally, 140 (13.4%) evaluated Version C.

## IV. Results

### 1. Essential Information for Visiting Medical Institutions

When participants were asked to choose the types of essential information for visiting medical institutions, "the ease of consulting a doctor" followed by "information about the cost" and "reputations and word-of-mouth" were the most common. "The ease of consulting a doctor" means waiting time, office hours, and ease of scheduling an appointment. In terms of information related to quality of medical services, "treatment technique" ranked fourth. Table 2 compares the rankings of essential information based on the presence of a chronic illness.

Table 2. Ranking of essential information (Multiple answers allowed)

Ranking	With chronic illnesses (n=219)	Without chronic illnesses (n=145)
1	Ease of consulting a doctor (n=175)	Information about the cost (n=112)
2	Information about the cost (n=157)	Ease of consulting a doctor (n=110)
3	Treatment technique (n=139)	Reputations and word-of-mouth (n=96)

Currently, few medical institution websites provide easy-to-understand information about “the ease of consulting a doctor” and “information about the cost”, even though customers find these to be important factors. Despite the advances of appointment-making systems, confirming service hours and finding information about costs remain difficult. Because costs may depend on many factors such as the general health of the patient, examination and treatment required, ratio of cost share, or availability of public funds, “information about the cost” is difficult to present. On the other hand, organizational philosophy, basic policy, and history can be easily shared despite the low priority reported by customers, highlighting the difference in awareness between service providers and customers.

Participants with chronic illnesses tend to place a greater importance on “the ease of consulting a doctor” rather than “information about the cost” with “treatment technique,” which is an objective index, ranked third. On the other hand, subjects without chronic illnesses tend to emphasize “information about the cost” rather than “the ease of consulting a doctor,” with “reputations and word-of-mouth,” which is subjective information, ranked third. These results indicate that those with chronic illnesses show more interest in practical information compared to those without chronic illnesses.

## 2. Use of Medical Institution Websites and Information Sources Utilized

Table 3 is a cross table showing consultations with medical institutions and the use of medical institution websites in the last six months. Among the sources of information, “family and friends” ranked first, “medical institution websites” ranked second, and “rumors and reputations” ranked third.

Table 3. Consultation with medical institutions and use of medical institution websites

Information source utilized	Browsed before consultation	Browsed after consultation	Searched, no official website	Did not browse official website	Did not use the Internet	Did not consult	Total
Signboard/ads	51	14	8	14	56	28	149
<b><u>Rumors and reputations</u></b>	134	39	10	22	174	102	<b><u>444</u></b>
Public guides	44	13	4	6	50	31	138
<b><u>Family and friends</u></b>	169	53	10	<b><u>30</u></b>	<b><u>287</u></b>	<b><u>153</u></b>	<b><u>650</u></b>
Books, magazines	26	6	2	0	21	13	60
TV	20	4	2	0	18	16	56
<b><u>Medical-institution websites</u></b>	<b><u>215</u></b>	<b><u>68</u></b>	<b><u>20</u></b>	27	94	105	<b><u>465</u></b>
Pharmaceutical companies' official website	13	2	2	0	5	5	25
Review sites and Search engine results	126	32	14	27	62	62	283
Other	3	2	0	0	34	15	52
Number of respondents	253	82	22	40	395	264	983

The table show that the people who use the Internet regularly rely on the medical institutions websites and the people who do not use the Internet rely on recommendations from their family and friends when they want to select a medical institution.

Comparing the level of use of medical institution websites shows different characteristics between those who browsed on the Internet and those who did not. The former group tends to choose medical institution websites as the most reliable information source, while the latter relies on family and friends as information sources. The perceptions toward review sites and search engine results show an interesting contrast. Customers who use the Internet tend to use medical institution websites instead of review sites and search engine results.

### 3. Provided Information and Its Influence on Memory and Attitude

To study memory, the study focused on 1) the main page, 2) information on physicians, 3) introduction of staff, 4) consultation information, and 5) information on examinations. Websites were evaluated using 6) understandability of the website and 7) likeability of the website, while 8) familiarity, 9) cleanliness, 10) trust, 11) equipment, 12) expectation for hospitality, and 13) intention to make an appointment were used

to assess the attitude towards medical institutions. As a result of measuring 1) to 13) in Versions A, B, and C and analyzing the variation, items 1), 3), 5), 6), 7), 8), 9), 10), 11), and 13) showed significant differences when the significance level was set to 0.05 (Table 4).

Table 4. Analysis of variance

		Square sum	Degrees of freedom	Mean square	F-measure	Significance probability
1) Memory of the main page	Between groups	30.056	2	15.028	16.017	0
	Within a group	929.793	991	0.938		
	Total	959.848	993			
3) Memory of staff introductions	Between groups	180.386	2	90.193	77.702	0
	Within a group	1158.435	998	1.161		
	Total	1338.821	1000			
5) Memory of information on examinations	Between groups	8.407	2	4.204	4.383	0.013
	Within a group	706.776	737	0.959		
	Total	715.184	739			
6) Understandability of the website	Between groups	8.534	2	4.267	5.626	0.004
	Within a group	577.915	762	0.758		
	Total	586.45	764			
7) Likeability of the website	Between groups	10.054	2	5.027	6.097	0.002
	Within a group	628.278	762	0.825		
	Total	638.332	764			
8) Familiarity	Between groups	6.451	2	3.225	3.777	0.023
	Within a group	633.581	742	0.854		
	Total	640.032	744			
9) Cleanliness	Between groups	10.385	2	5.192	7.78	0
	Within a group	495.221	742	0.667		
	Total	505.605	744			
10) Trust	Between groups	13.474	2	6.737	10.408	0
	Within a group	480.263	742	0.647		
	Total	493.737	744			
11) Equipment	Between groups	15.03	2	7.515	9.892	0
	Within a group	563.714	742	0.76		
	Total	578.744	744			
13) Intention to make an appointment	Between groups	8.457	2	4.228	4.859	0.008
	Within a group	645.683	742	0.87		
	Total	654.14	744			

Table 5 shows the results of multiple comparisons by Bonferroni for items with a significant difference. Only 3) and 8) show significant differences between Versions B and C, whereas Version A exhibits significant differences for 1), 3), 6), 9), 10), 11) and 13) compared to Versions B and C. The comparison of A, B, and C shows that the mean value of evaluation of A is higher than B for 3) while evaluation of B is higher than C for 11). For all other results, the size of the mean value is in order of A<B<C.

Table.5 Results of multiple comparisons (Bonferroni)

			Mean difference	Standard error	Significance probability	95% Confidence interval	
						Lower limit	Upper limit
1) Memory of the main page	A	B	-0.336	0.065	0	-0.49	-0.18
	A	C	-0.397	0.105	0	-0.65	-0.15
3) Memory of staff introductions	A	B	0.775	0.072	0	0.6	0.95
	A	C	-0.316	0.117	0.021	-0.6	-0.03
	B	C	-1.091	0.117	0	-1.37	-0.81
5) Memory of information on examinations	A	C	-0.272	0.103	0.026	-0.52	-0.02
6) Understandability of the website	A	B	-0.168	0.069	0.046	-0.33	0
	A	C	-0.277	0.091	0.007	-0.49	-0.06
7) Likeability of the website	A	C	-0.32	0.094	0.002	-0.55	-0.09
8) Familiarity	A	C	-0.271	0.102	0.024	-0.51	-0.03
	B	C	-0.249	0.102	0.045	-0.49	0
9) Cleanliness	A	B	-0.213	0.065	0.003	-0.37	-0.06
	A	C	-0.289	0.09	0.004	-0.51	-0.07
10) Trust	A	B	-0.232	0.064	0.001	-0.38	-0.08
	A	C	-0.345	0.089	0	-0.56	-0.13
11) Equipment	A	B	-0.296	0.069	0	-0.46	-0.13
	A	C	-0.258	0.096	0.022	-0.49	-0.03
13) Intention to make an appointment	A	B	-0.139	0.074	0.185	-0.32	0.04
	A	C	-0.308	0.103	0.008	-0.55	-0.06

#### 4. Quality of Information and Browsing Behavior

The study used Pearson's correlation coefficients to find the difference in the relationships among distance, time, and website evaluation based on the displayed information. The correlation was investigated based on three pages: the main page, introduction of staff, and information for patients.

While a correlation is observed between the distance and the time in all the three versions, the degree of the correlation depends on the quality of information. The correlation for the main page is as follows: A ( $r=0.835$ ;  $p<0.01$ ), B ( $r=0.577$ ;  $p<0.01$ ), and C ( $r=0.378$ ;  $p<0.01$ ). Version A shows a high correlation between the distance and the time followed by Version B and then Version C.

The correlation between the distance and the time for the page introducing the information on physicians and staff is as follows: A ( $r=0.756$ ;  $p<0.01$ ), B ( $r=0.774$ ;  $p<0.01$ ), and C ( $r=0.222$ ;  $p<0.05$ ). The correlation between the memory of information on physicians and the memory of information on staff members is as follows: A ( $r=0.596$ ;  $p<0.01$ ), B ( $r=0.418$ ;  $p<0.01$ ), and C ( $r=0.746$ ;  $p<0.01$ ).

For the "information for patients" page, which provides service details and information on examinations, the correlation between the distance and the time is as follows: A ( $r=0.935$ ;  $p<0.01$ ), B ( $r=0.143$ ;  $p<0.01$ ), and C ( $r=0.215$ ;  $p<0.05$ ). The correlation between the memory of service details and the memory of information on examinations is as follows: A ( $r=0.559$ ;  $p<0.01$ ), B ( $r=0.459$ ;  $p<0.01$ ), and C ( $r=0.490$ ;  $p<0.01$ ).

There is a higher correlation between the distance and the time for Version A and a low correlation between the distance and the time for Version C. While the correlation alone does not suggest the depth of navigation, Version A is text-heavy. It is assumed that website visitors browse by scrolling up and down. Although Versions A, B, and C all have the same area for the main page and introduction of staff, the “information for patients” page in Version C is longer as it combines information provided in A and B, which may affect scrolling.

In addition, neither the browsing distance and the memory nor the time spent on the page and memory for the main page, introduction of staff, and information for patients were correlated in any of the versions. Thus, a longer navigation and browsing distance does not necessarily increase memory.

## 5. The Relationship between the Evaluation of the Website and Intention to Make an Appointment

The study obtained Pearson’s correlation coefficients to examine how the understandability of the website, likability of the website, familiarity, cleanliness, trust, equipment, and expectation of hospitality influence the intention to make an appointment. The correlations with the intention to make an appointment are as follows: understandability of the website ( $r=0.596$ ;  $p<0.01$ ), likability of the website ( $r=0.767$ ;  $p<0.01$ ), familiarity ( $r=0.732$ ;  $p<0.01$ ), cleanliness ( $r=0.591$ ;  $p<0.01$ ), trust ( $r=0.755$ ;  $p<0.01$ ), expectation of hospitality ( $r=0.694$ ;  $p<0.01$ ), equipment ( $r=0.629$ ;  $p<0.01$ ), influence of the website on the intention to make an appointment ( $r=0.449$ ;  $p<0.01$ ).

Based on the results from Sections 1–4, two findings lead to causal relationships between the observed variables. First, the quality of information provided on the website (e.g., subjective information or objective information) affects customers’ memory of the information and their attitudes towards the actual medical institution. Second, customers’ evaluation on the website affects their intention to make an appointment or perform other actions. Figures 2 and 3 respectively show the influence of subjective (Version A) and objective information (Version B) to clarify differences for a comparison purpose. In both Versions A and B, a model where health consciousness affects the desire to receive medical care, desire affects the memory of a website, memory affects the evaluation of website, and evaluation of website affects the evaluation of the actual medical institution and the intention to finally make an appointment was validated.

In terms of the individual path coefficients, Versions A and B have different path coefficients. The difference in the path coefficients is observed in the path where health consciousness leads to the desire to receive medical care and the path where the memory of the website leads to the evaluation of the website. Objective information has a more positive effect on customers’ memory and the evaluation of medical

institution websites than subjective information. This suggests that subjective information affects emotional aspects and objective information affects the evaluation.

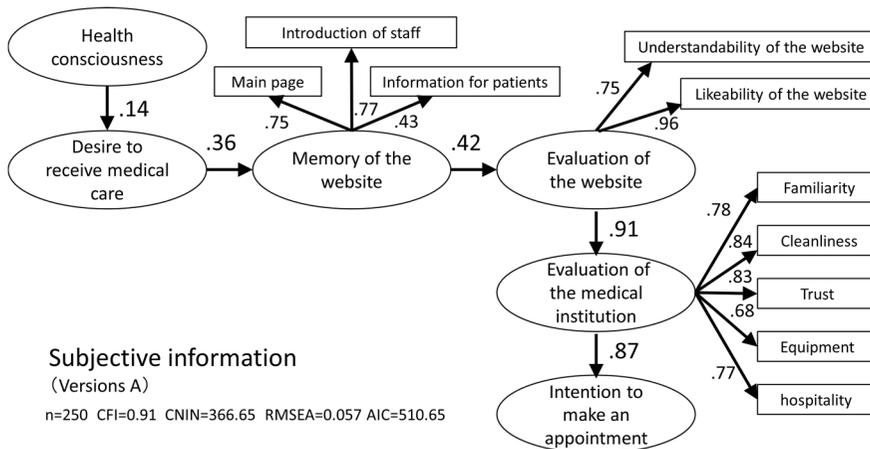


Fig. 2. Model of the effects of a medical institution website on customers' attitudes (subjective information)

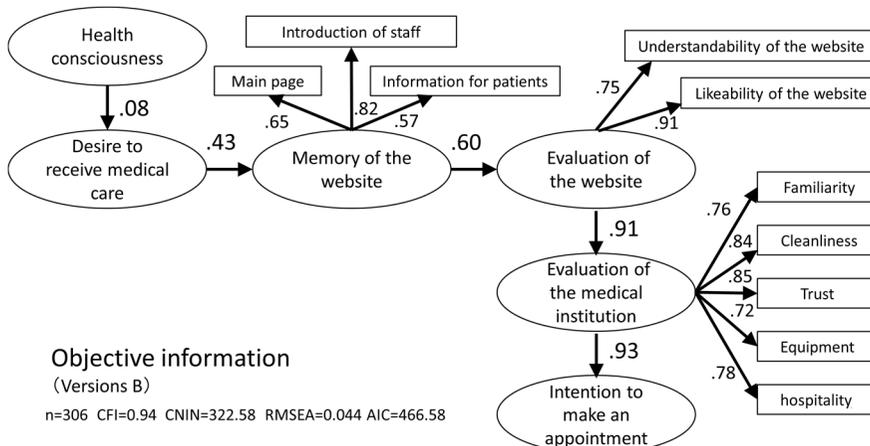


Fig. 3. Model of the effects of a medical institution website on customers' attitudes (objective information)

## V. Conclusion

This study demonstrated that medical institution websites are important advertising media, which impact customers' choices and their intention to make an appointment. In addition, the evaluation of medical institutions can be increased by effectively combining subjective information and objective information. This research revealed that the evaluation of the website increased the evaluation of the medical institution and the evaluation of the medical institution affected the intention to make an appointment. It is important to develop communication strategies and provide positive customer experiences which motivate patients.

Because this study was carried out on the Internet, it was designed for people who frequently use the Internet. Although Internet use needs to be taken into consideration, this study on information searches by customers of medical institutions found that medical institution websites are highly recognized as a source of information compared to signboards/ads, books, magazines, and television. This highlights the importance of websites as media to promote medical institutions.

From the customer experience point of view, the responses depend on whether medical services are received. Comparing participants with and without chronic illnesses reveals different evaluations of subjective and objective information. The results suggest that participants who regularly receive medical services tend to prioritize objective information over subjective information. In the case of credence goods like medical services, which are difficult to evaluate, the study concludes that customers value official information such as medical institution websites rather than resorting to review sites and search engines where it is difficult for customers to verify the value judgment and trust of the information provider.

With regard to the relationships among the evaluation of the website, the evaluation of the actual medical institution, and intention to make an appointment, the study clarifies three findings:

1. Evaluation of the website, evaluation of the actual medical institution, and intention to make an appointment are closely connected.
2. Objective information is more effective for memory and website evaluation than subjective information.
3. Memory is influenced by health consciousness and the desire to receive medical care.

A website of a medical institution has a significant advertising effect and plays an important role in marketing communications. At the touchpoint with customers on the website, arousing the health consciousness and the desire to receive medical care should enhance patients' memories of the website and encourage intentions to make an appointment at the medical institution. Similarly, by providing objective information, such as past achievements on the website should enhance customers' memory and evaluation of the medical institution.

This study has two limitations. One is the issue with obtaining log data. Retrieving results is affected by

the Internet environment and the degree of understanding of the participants. The explanation prior to viewing the websites must be improved to obtain more valid samples. Another limitation is that deeper analysis may be possible if more questions are asked about the information in the three types of websites. A future study is required to further elucidate customers' attitudes towards websites.

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#### Note

- i) "Sen" is an online survey system that combines a questionnaire system and a variety of experimental systems to investigate consumers' preference. It was developed by Shoji Yamamoto (Kwansei Gakuin University), Yukinobu Hamuro (Kwansei Gakuin University), Chihiro Morito (University of Marketing and Distribution Sciences) and other reseachers. The functions consist of 1) a questionnaire with various scales, 2) a selection experiment with pair comparisons presenting images and attributes, 3) a preference experiment by obtaining information from the information display board (matrix), and 4) a website evaluation experiment. 4) allows the time spent on the site and movements up and down from the log data to be recorded. It also records "back" clicks, revealing how users navigate between pages. The browsing time is measured in seconds and the navigation distance is measured in pixels. In *Sen*, contents created by a researcher are available to other researchers' research scenario. The results are retrieved only when the server experiment is completed. This allows time to be measured independent of the Internet connection. This study used 1) and 4).