A Study on Longitudinal Differences in Website Users' Trust Factors According to Website Types and Time Differences

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Abstract

As internet businesses are expanding in diverse areas, studies related to web sites are also being performed actively. Especially in the area of e-commerce, web sites trust factors have been treated as a major research issue. However, these studies are mostly on demographic differences among site visitors including cultural differences, regional differences, sex, etc. There exist a few longitudinal studies that compare web site trust factors according to time differences. In this study, we test longitudinal differences of web sites trust factors by comparing questionnaires in year 2001 and year 2011. Based on the study, it is concluded that trust factors web sites of web sites of year 2011 are not same as those of year 2001. Further, the changes show different behavior according to website types.

Keywords: *Longitudinal Study, Website Trust Factors, e-business, e-Commerce*

1. Introduction

A longitudinal research is a popular research type in information technology (IT) studies as well as in other areas. However, the existing longitudinal studies on web sites are mostly related to business transaction and the transformation of information technology itself. In IT area, technology transformation speed is far faster compared to other industrial areas. And even the entire business environment can be changed by the appearance of new business concepts. In this study, we analyze changes in web site trust factors between 10 years ago and 10 years later (2001 vs. 2011) for 3 website types including a news website, a shopping website, and an entertainment website. Our purpose is to verify that time and/or website types work as mediating variables for web site trust factors by examining differences among trust factors and their strength as website types and times changes. This is based on the arguments that exogenous variables such as age work as exogenous variables for trust factors, which are suggested in the previous studies [1]. That is, we intend to validate if time and website type work as valid exogenous variables. This research theme is drawn from the fact that website trust estimation index is not fixed but very flexible in high extent [2].

2. Theoretical Background

2.1 Definition of Trust

Concepts of trust have been defined as shown in (Table 1). By applying these traditional concepts of trust to e-commerce, we define it as a confidence of consumers about sellers in electronic commerce.

Table 1. Definition of Trust

Researchers	Concept of Trust
Lee, M., Turban E. (2000)	A major determining factor in consumer confidence about the seller
Morgan, R.M., Hunt, S.D. (1994)	A fulfillment of the expectation and the responsibility that counter-party wants to cooperate in bilateral relations
Bulter, J.K.(1991)	Anything like reliability, consistency, fairness , etc.
Doney, P.M., Cannon, J.P. (1997)	Buyer and seller relationship in terms of reliability factors

2.2 Previous Studies Related to Websites Trust Factors

Most studies on website trust factors have been on testing differences of trust factors based on nationality, culture, age, and/or characteristics of users. Particularly they are related to revisits and repurchases of consumers. Previous studies related to the website trust factors are arranged in Table 2.

Table 2. Previous Studies of website Trust

Researches	Topics of Researches
Yea, S., Jang, H., Kim, S., Kim C., Song, M. (2009)	Credibility of Korea Oriental Medi cine Web Sites
Jung, C., Jung Y. (2007)	The determinants of Trust in Internet Shopping Mall : Cross national study on Korean and Chinese Users
Kim, Y. (2007)	Factors of Trust Building of Internet Shopping Mall in Initial Startup Business
Kim,Y.(2008)	Development of Indicators for Evaluating the Web Credibility by Goodness-of-fit Analysis
Choe, J. (2004)	Cultural differences in the design of information systems
Ko, H., Jung, J., Kim, J., Shim, S. (2004)	Cross-Cultural Differences in Perceived Risk of Online Shop ping
Park, C., Jun, J (2003)	A Cross-Cultural Comparison of Internet Buying Behavior : Effects of Internet Usage, Perceived Risks and Innovativeness
Shin, K., Jeong, C., Lee, C. (2012)	Longitudinal Differences in Web- site User's Trust Factors
Jung, Y., Park, J. (2001)	Cultural Studies within the Shop- ping Mall Operating Strategy
Javenpaa, S.L., Tractinsky, N. (1999)	Consumer Trust in an Internet Store : A Cross-Cultural Validation

2.3 Previous Studies on Longitudinal Research of IT

Longitudinal studies have been performed actively since 1990s in IT area. They include such studies as A Longitudinal Study on the Internet delinquency in Adolescents [18], Understanding Web-site Attributes of High-Visit Plastic Surgery Websites. [19] Though

many issues are covered by these longitudinal studies as shown in (Table 3), website properties such as trust factors are rarely covered.

Table 3. Longitudinal Researches of IT

Researches	Topics of Researches
Luo, J., Ming Fan, Han Zhang (2012)	Information technology and organ- izational capabilities: A longitudinal study of the apparel industry
Shin, K., Jeong, C., Lee, C. (2012)	A study on longitudinal differences in web site user's trust factors
Lee, G., Xia, W. (2011)	A longitudinal experimental study on the interaction effects of persuasion quality, user training, and firsthand use on user perceptions of new Information Technology
Lee, S. (2010)	Early adolescent self-concept and negative deviations of the Internet on a longitudinal study: applying latent growth curve models
Chen, R., Sun, C., Helms, M.M., Jih W. (2008)	Aligning IT and business strategy with a dynamic capabilities perspective: A longitudinal study of a Taiwanese Semiconductor Company
Chu, S., Leung, L.C. Hui, Y.V., Cheung, W. (2007)	Evolution of e-commerce Web sites : A conceptual framework and a longitudinal study
Nathan Heinze, Qing Hu (2006)	The evolution of corporate web presence: A longtudinal study of large American companies
Kang, D. (2006)	The workflow application as an unintended medium for organizational learning : A longitudinal field study
Kohli, R., Devaraj, S. (2004)	Contribution of institutional DSS to organizational performance : evidence from a longitudinal study
Nicholas, D., Huntington, D., Williams, P. (2003)	Three years of digital consumer health information : a longitudinal study of the touch screen health kiosk
Jurison, J. (1996)	The temporal nature of IS benefits: A longitudinal study
Willcocks, L.P Lacity, M.C, Kern, T (1999)	Risk mitigation in IT outsourcing strategy revisited : longitudinal case research at LISA

As arranged in Table 3, they encompass IT utilization in a specific industry, the utilization of certain equipments such as a touch screen. However, users attitudes for It technology are rarely covered in longitudinal studies. In this regard, we conducted a longitudinal research on website trust factors and investigated the changes that website trust factors show from 2001 to 2011.

3. Research Model and Research Design

3.1 A Conceptual Research Model

To test changes in web site trust factors, we propose a research model that includes website types and time as mediating variables. As shown in (Figure 1), web site factors such as design, contents and technology are tested for their impacts to web site trust. In testing these relationships among web site factors and trust, time and web site types are treated as mediating variables.

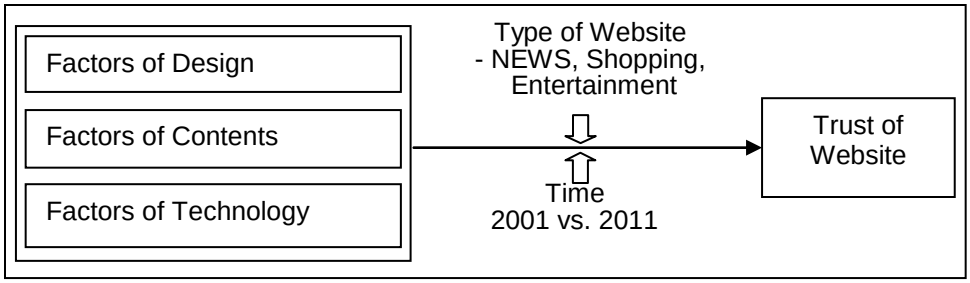

Figure 1. A Conceptual Research Model

Web site factors were derived from previous research results by collecting variables that were referred in the previous studies. The factors on design, technology, and contents were established as independent variables, web site trust was established as the dependent variable, and website types and time were established as mediating variables. To compare changes in trust factors and their strengths, the independent and dependent variables were set to be the same as those in the 2001 study [3].

3.2 Hypotheses

In this study, 2 hypotheses are established to examine the differences of trust factors and their strengths according to time difference and website types.

[Hypothesis-1] For websites of a same type, the website trust factors that the website users perceive might not be the same time changes.

[Hypothesis-2] Changes in web site trust factors might differ according to web site types.

3.3 Definition of Research Variables

The research variables are defined as shown in (Table 4). They are extracted by reviewing variables used in previous studies.

Table 4. Research Variables

Factor	Variables	Source
Design	1. Immersion 2. Design Freshness 3. Design Intuitiveness 4. Easy UI Function Provision 5. Navigation Easiness 6. Color Appropriateness 7. Blank Appropriateness	Shin. K. (2001)
Contents	1. Timely Contents Provision 2. Good Qualitative Contents 3. Understanding Easiness 4. Clear and Distinct Contents 5. Abundant Contents	Shin. K. (2001)
Technology	1. Security 2. Response Time 3. System Stability	Shin. K. (2001)
Trust	1. promise fulfillment 2. openness 3. fairness 4. Ability 5. Reputation	Shin. K. (2001)

3.4 Data Collection

In order to collect data, a survey was conducted through a web questionnaire method. To minimize the external influence on sample selection, it was done by a professional research agency, INR PLUS. In year 2011, data were collected for 2 weeks from 2011/10/06 to 2011/10/17. In year 2001, data were collected for 3 days from 2001/04/17 to 2001/04/19. In questionnaires, Likert Scale of 5 scores is used for each item.

4. Tests and Analysis

4.1 Samples

For year 2001 and year 2011, 1032 samples and 622 samples were collected, respectively. Among these initial samples, data for certain website types for which more than 100 questionnaires exist were selected as test data. By this process the questionnaires data on websites of news, shopping, and entertainment type are selected as final samples for analysis - 412 samples for 2011 and 540 samples for 2011.

4.2 Factor Analysis

Factor analysis are conducted to verify that research variables are classified into the factors in the research model. We derived factors by classifying questionnaire items whose factor loading value and factor communality is higher than 0.5[30]. To examine repeatability of experiments, reliability validation was conducted for the variables. The factors have a good reliability because their Cronbach (α)s are higher than 0.6. It is generally said that a factor is reliable when its alpha value is higher than 0.6[30]. For three website types of news, shopping and entertainment, the relationship between trust factors and the dependent variable are summarized in (Table 5).

Table 5. Significance of Trust Factors

Types	Factors	Data in 2001	Data in 2011
NEWS	Design	R^2 = 0.297 Y=0.215+0.781D	R^2 = 0.327 Y=0.248+0.619D
	Technology	R^2 = 0.235 Y=0.317+0.609T	R^2 = 0.253 Y=0.346+0.486T
	Contents	R^2 = 0.215 Y=0.314+0.558C	R^2 = 0.338 Y=0.266+0.576C
Shopping	Design	R^2 = 0.136 Y=0.346+0.622D	R^2 = 0.102 Y=0.390+0.513D
	Technology	R^2 = 0.075 Y=0.482+0.433T	R^2 = 0.200 Y=0.379+0.571T
	Contents	R^2 = 0.120 Y=0.344+0.618C	R^2 = 0.239 Y=0.230+0.777C
Entertainment	Design	R^2 = 0.146 Y=0.372+0.453D	R^2 = 0.573 Y=0.067+0.913D
	Technology	R^2 = 0.071 Y=0.495+0.267T	R^2 = 0.534 Y=0.195+0.709T
	Contents	R^2 = 0.194 Y=0.363+0.445C	R^2 = 0.591 Y=0.081+0.852C

Examining the values in (Table 5), the influence of design factor is reduced for news websites and shopping websites. The influence of technology factor and contents factor are increased regardless of website types. These results are statistically significant at the confidence level of higher than 95%.

4.3 Multiple Regression Analysis

Multiple regression analysis are conducted to identify input variables that influence website trust significantly. A stepwise regression method is applied to obtain a multiple regression equation by including input variables of highest significances. A confidence interval of higher than 95% is applied. Results are summarized in (Table 6).

Table 6. Results of Multiple Regression

Type	2001	2011
Type of NEWS Website	Trust = 0.215 + 0.445Design + 0.295Contents	Trust = 0.203 + 0.346Contents + 0.338Design
Type of Shopping Website	Trust = 0.346 + 0.622Design	Trust = 0.204 + 0.546Contents + 0.303Technology
Type of Entertainment Website	Trust = 0.363 + 0.445Contents	Trust = 0.399Contents + 0.391Design + 0.205Technology

As shown in (Table 6), trust factors change as time changes for a same type of websites.

First, in case of news websites, it is identified that, in 2011, significant factors for website trusts are ‘design’ and ‘contents’ that are same as the ones in 2001. However, the factor of highest coefficient is changed from ‘design’ in year 2001 to ‘contents’ in year 2011. It is inferred that the importance of timely and correct contents provisioning is regarded more

importantly than external design due to the intrinsic property of news websites as information media.

Second, it is analyzed that in case of shopping websites, in 2001, 'design' exercised strong influence on trust, but in 2011 'contents' and 'technology' are more significant factors for website trust. Thus, it is identified that interests of shopping website users have changed as time passes. It means that a radical change have occurred in trust factors of shopping websites due to environmental changes between the era of 2001 and 2011 and the learning effects of users. Thus, for a same type websites, the priorities of web site trust factors have changed from year 2001 to year 2011. It is judged that websites should be planned and constructed to fit to the business objective for management in parallel with users' perception of trust. The latter might decide revisits of users to web sites. Based on this result, it might be said that Hypothesis 1 is not rejected.

Third, it is analyzed that in case of entertainment websites, in addition to 'contents', 'design' and 'technology' are judged to grow to be more important factors for website trust. as time passes. In results of analysis of 3 website types, it is found that website trust factors are different according to website types. It is analyzed that in 2011, in case of news websites, 'contents' and 'design' exercise major influence on website trust; in case of shopping type sites, 'contents' and 'technology' exercise major influence; and in case of entertainment sites, all 3 factors of 'contents', 'design', and 'technology' exercise major influence. This means that, even at a same time, trust factors which users perceive might be different according to website types.

5. Results and Limitations

5.1 Research Results

In this study, we analyzed what difference appears in website trust factors according to time difference and website type. For this, 3 types of web sites are analyzed in year 2001 and 2011. The first conclusion of the empirical validation in this study is that web site trust factors of a same website type which the users of websites judge change according to time passage. The second conclusion is even on a same time point trust factors which the users of websites judge are different according to the difference of website type (a news website, a shopping website, an entertainment website). Based on these conclusions, the fact that time and website type function as mediating variables for determining website trust factors is drawn as the result of this study.

5.2 Limitations and Further Studies

As a limitation, though this study identifies website trust factors of the users according to website type and time difference, it does not explain what influence these trust factors exercise on real activities of website users (i.e., information uploading, downloading, visiting frequency, etc.). To answer these questions, further researches need to be done on testing actual influence of website trust factors on user behaviors. For this, we aim at drawing an additional conclusion which is more substantial and which can be directly applied to practical jobs by analyzing the relationships between website trust factors of website users which vary according to website type and time difference and user activities such as information download, upload, and visit frequencies for certain websites.

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