

Assessment of Reliability and Validity of Perceived Credibility of Corporate Blogs

Uday S. Tate¹, Elizabeth Alexander², Avinash Waikar³
and Basanna. S. Patagundi⁴

Abstract

Recent years have experienced an exponential growth in the use of weblogs as a marketing tool. With this surge in blogs used as marketing tools, the question remains: how credible are blogs as a source of consumer information? How do consumers perceive the credibility of blogs from different sources when making purchase decisions and product evaluations? The primary objective of the present study is to assess validity and reliability of a set of Semantic Differential scales purported to measure perceived credibility of blogs posted by corporations. Confirmatory factor analysis via LISREL8.5 package was used to obtain appropriate statistics for convergent validity, Discriminant validity, and composite reliability. In general, the scales used to measure the two hypothesized factors (source credibility and content credibility) for each type of blog achieved a satisfactory level of construct validity.

Key words : *Semantic Differential Scales. Discriminant Validity, Composite Reliability*

1. Introduction

Weblogs, popularly known as "blogs," were introduced in late 90s. Initially, they were referred to as an array of links developed and maintained by individuals with Internet technology background. Steadily, blogs caught the attention of mainstream Internet visitors, resulting into a mass of journal and diary entries, political and religious issues, and reflection on one's lifestyle (Ng and Falkow, 2008). With its popularity increasing exponentially, the corporate world showed a keen interest in blogs to use them as a marketing tool, specifically for niche markets.

For example, Business Week (www.businessweek.com; October 24, 2007) reported over 106 million blogs in the month of September, 2007, about 12 million more than the previous month. Blogs are defined as interactive websites or online journals. Essentially, a blog allows an individual to read online postings which are frequently updated. They also allow individuals to post their own comments or responses. Blogs contain text, media, images and data, all arranged in a chronological fashion. Some blogs also utilize links to other sites and advertising (Dearstynne 2005; Quible 2005).

¹ Marshall University-WV, USA, ²Marshall University-WV, USA, ³ Southeastern Louisiana University-USA, ⁴Bhavan-Marshall MBA Program, India

Blogs are now being utilized by corporations as an interactive, two-way communication channel with their customers. In other words, blogs posted by corporations can play a major role in the consumer decision process. Potential buyers may use corporate blogs as a source of information and decision aid. In the post-purchase stage, the blog can be used as a channel for either complaint or praise. Corporate blogs can also provide information of additional product benefits or answers to utilization questions. Of course, consumers may also choose to use other blog types for similar tasks. A blog maintained by an individual could be accessed for product information before and after purchase. It also acts as a feedback mechanism. Getting pulse of a customer is a major input in designing marketing strategy. Blogs enable organizations to reach out and feel the pulse of customers. Blogs of all types may provide motivation to seek additional product information.

Since blogs have become a widely used source of consumer information, it is imperative that one must investigate how credible are blogs perceived by consumers. A recent study by Envision Solutions and the Medical Blog Network (December, 2006) concluded that "only 23 percent of bloggers say that 81 percent to 100 percent of blogs are written by individuals they implicitly trust." After reviewing several studies on blogs, Johnson and Kaye (2004) concluded that while there is no dearth of research on credibility of traditional sources of consumer information, majority of the reviewed studies focused on the traditional media such as radio, television, and newspapers, but they did not find any study that focused on the issue of credibility of blogs as an information source for consumers. These authors have called for research to examine the credibility of blogs as source of information. However, before any such attempt is made, it is imperative that researchers focus on the psychometric properties (i.e. validity and reliability) of scales they use to measure source credibility with respect to blogs. The present study attempts to assess the construct validity (convergent validity, Discriminant validity, and reliability) of scales used to measure perceived credibility of blogs developed by corporations.

2. Research Questions and Methodology

Results of our study will allow for an initial understanding of the psychometric properties of the scales used to measure consumer perceptions with regard to source and content credibility of blogs developed by corporations. In addition, it will provide a foundation to further refine the existing scales.

In order to collect data for our study, a questionnaire based on a comprehensive literature review, a focus group session, and faculty input was used. The questionnaire included a series of scales measuring the respondent experience with blogs and their perceptions of blog's credibility as a source of information. Respondents' perceptions were measured on nine 5-point, Semantic Differential scales (for example: trustworthy-untrustworthy, honest-dishonest and so on). The present study used the measurement scales developed by Beltramini (1988). However, one of the original ten items was omitted due to its irrelevance to the topic under study.

The study used convenience sampling conducted by trained research assistants who distributed the questionnaire to student and non-student groups in a small city located in the western part of West Virginia, USA.

3. Survey Analysis

The survey resulted in 418 usable questionnaires. The sample consisted of 52 percent male and 48 percent female respondents with the average age of 27.6 years. The majority of the respondents were college students (56 percent). Of the total sample, 65 or 15% reported not having access to a computer at their residence, and 43 (9%) reported not using the Internet. When reporting blog experience 99 (23%) reported some level of experience with blogs and 169 (39%) reported knowledge of but no experience with a blog.

Respondents with at least some blog knowledge were asked to evaluate the credibility of information contained in a blog operated and owned by corporations. A previously developed scale was adjusted and utilized for this measure (Beltramini, 1988; Bruner and Hensel 1998). Nine items were rated on a 5-point Semantic Different

scale. The means and standard deviations of the scales for each type of blog are reported in Table 1.

Scale	Blogs by Corporations	
	Mean	Std Dev
Unbelievable-Believable	3.2	1.12
Trustworthy-untrustworthy	3.08	1.04
Not convincing-convincing	3.34	0.94
Unreasonable-reasonable	3.31	0.93
Credible-not credible	3.08	0.99
Honest-Dishonest	3.07	1
Unquestionable-questionable	2.91	0.93
Conclusive-inconclusive	3.14	0.97
Not authentic-authentic	3.26	0.98

Table 1 Means and Standard Deviations of Scales Measuring Credibility Perception

Note 1 : represents the negative anchor of the scale, whereas 5 reflect the positive anchor.

4. Validation Analysis

According to Trochim (2006), "construct validity refers to the degree to which inferences can legitimately be made from the operationalizations in one's study to the theoretical constructs on which those operationalizations were based." In other words, construct validity is the extent of agreement between a theoretical concept and its empirical evidence (in terms of specific measurement scales). Bagozzi (1980), James, Mulaik, and Brett (1982), Joreskog and Sorbom (1983), Fornell and Larcker (1981), and Netermeyer, Johnston, and Burton (1990) propose three basic criteria of construct validity, namely, convergent validity, Discriminant validity, and reliability. Specifically, convergent validity is defined as "the degree to which the operationalizations is similar to (converges on) other operationalizations that it theoretically should be similar to" (Trochim 2006). On the other hand, Discriminant validity is "the degree to which the operationalizations is not similar to (diverges from) other operationalizations that it theoretically should be not similar to" (Trochim 2006). Finally, in the present research reliability was defined in terms of internal consistency of

the scales used to measure the hypothesized constructs (source credibility and content credibility). Trochim (2006) defines internal consistency in the results for different items (scales) for the same construct within the measure. The current research used the three criteria to establish the construct validity of the scales reported in Table 1 for each source.

To assess convergent validity, Discriminant validity, and internal consistency of the scales used to measure source and content credibility, the correlation matrix of the nine scales of perceived credibility with regard to blogs posted by corporations) was subjected to LISREL 8.5 version (Jorskog and Sorbom 2003). Due to space limitations, the correlation matrices are not displayed; interested readers or reviewers can obtain them from the contact author.

5. Validation Results and Discussion

The main purpose of the present study was to assess the construct validity of scales used to measure perceived credibility of blogs developed by corporations. The evidence of convergent validity can be assessed by examining the factor loading of the measures and their respective t-values extracted by LISREL. In general, a factor loading of 0.70 and above is a good indicator of convergent validity. Discriminant validity is the extent to which two factors (theoretical constructs) are independent from each other, measured in terms of their respective scales. Fornell and Larcker (1981) suggest that Discriminant validity is evident when the squared value of the correlation between two factors is less than the variance extracted from each factor separately. Finally, composite reliability can be determined by assessing the internal consistency of the measures. The composite reliability of the measures of the two hypothesized factors was calculated using the formula provided by Fornell and Larcker (1981, p. 45). An internal consistency of 0.70 is considered as satisfactory (Joreskog and Sorbom 1989).

To assess the convergent validity of the nine scales for each corporate blog, the following procedure was used. Three separate correlation matrices were subjected to LISREL 8.5. For each matrix, a null model (hypothesizing no factor structure) was first run. The next model was a

one-factor model where all nine items were hypothesized to represent one overall dimension (factor) only. Finally, a two-factor model was run. The two factors were initially determined by an exploratory factor analysis based on a hold-out sample of 80 from the original sample of 418. The two factors were labeled as: source credibility and content credibility. For the null, one-factor, and two-factor models, chi-square values, degrees of freedom and a select group of goodness of fit indices were obtained. The three models represented a nested sequence for comparison. This approach is recommended by Bentler and Bonnett (1980) and further expanded by James, Mulaik, and Brett (1982). The overall estimates of the three models are shown in Table 2 for blogs by corporations.

According to Joreskog and Sorbom (1989), the value of RMSR closer to zero indicates a better fit of the model. Table 2 shows that RMSR for corporate blogs decreases from .43 for the null model to .05 for the correlated two-factor model indicating an acceptable goodness-of-fit for the latter.

It is not sufficient to assess the model fit in order to determine the psychometric properties of the scales used to measure theoretical constructs. For that one needs to examine and evaluate convergent validity, Discriminant validity and internal consistency of the measures. Again, we used the LISREL approach to determine the psychometric properties of the scales used in the present study. Specifically, standardized factor loadings, their

Model	χ^2	df	NNFI	PNFI	AGFI	RMSR
Blogs by Corporations						
Null Model	1319.03	36	.00	.00	.18	.43
One-Factor Model	468.24	27	.54	.48	.41	.15
Correlated Two-Factor Model	123.88	26	.90	.65	.84	.05
Perfectly Correlated Two-Factor Model	178.21	27	.84	.65	.79	.51

Table 2 Nested Model Comparisons: Three Sources of Blogs

Note: df=degrees of freedom; NNFI=non-normed fit index; PNFI=parsimony fit index; AGFI=adjusted goodness of fit index; RMSR=root mean square residuals.

As can be seen in Table 2, the worst fit is for the null model followed by one-factor model. On the other hand, the best fit is for the correlated two-factor model, as evidence by non-normed fit index, (NNFI), parsimony normed fit index (PNFI), adjusted goodness of fit index (AGFI), and root mean square residuals (RMSR). According to Bentler and Bonnett (1982), a value of .90 and above for NNFI and AGFI indicates an "acceptable" fit for the model. From Table 2, one can see that NNFI for the three models satisfy the Bentler-Bonnett condition. However, the correlated two-factor model failed to achieve the .90 cut-off point for AGFI. PNFI is useful when comparing a series of nested models. In the present case, the PNFI index increased from zero for the null model to .65 for the correlated two-factor model. Finally, According to Medsker, Williams, and Holahan (1994), RMSR indicates the mean of the differences between of the theoretical covariance matrix and the observed covariance matrix.

respective t-values, extracted variance for each factor, and composite reliability were obtained based on the covariance matrixes for each type of blog. Tables 3 and 4 show LISREL indices to assess the construct validity and reliability of the measures.

Joreskog and Sorbom (1989) suggest that a factor loading of 0.70 and above is an acceptable value to assess the correlation between a measure and its theoretical construct (factor). As can be seen in Table 3, the factor loadings for each of the factors (source credibility and content credibility) are at or above 0.70, with an exception of the factor loading for the item labeled as "unquestionable." All of the factor loading were statistically significant at .01 level. The variance extracted index for each factor was 0.55 and 0.66, for a value of 0.50 or above is acceptable (Netermeyer, Johnston, and Burton 1990). Finally, a composite reliability of the measures of

Factor and Indicators	Standardized loading	Error variance	Variance extracted estimate	t-values ^b
Source Credibility ^d	---	.88 ^a	.55	
Trust	.81	.34	.66	--- ^c
Credibility	.90	.20	.81	16.00
Honest	.80	.36	.64	13.83
Unquestionable	.60	.64	.36	9.61
Conclusive	.75	.44	.56	12.63
Content Credibility ^d	---	.88 ^a	.66	
Believable	.75	.43	.57	--- ^c
Authentic	.88	.23	.77	13.51
Reasonable	.81	.34	.66	12.50
Convincing	.79	.38	.62	12.11

Table 3 Measurement Properties for Blogs by Corporations

Note: ^adenotes composite reliability using the formula by Fornell and Lacker (1981).

^bt-values significant at p-level < .01.

^cThe indicator fixed to the value of 1 as a reference variable.

^dThe estimated correlation between the two factors = .52.

source credibility and content credibility is 0.88 and 0.88, respectively. As per Joreskog and Sorbom (1989), internal consistency of 0.70 and above is acceptable. Thus, the measures of the two factors have achieved a satisfactory level of convergent validity.

To assess the Discriminant validity of the measures of the two factors was assessed by comparing the squared value of the correlation between the two factors with their respective variance extracted. As stated earlier, this squared value should be less than the value of variance extracted for each of the two factors.

As can be seen in Table 4, the squared correlation value (0.27) between the two factors for each type of blog was less than the variance extracted for each factor separately, implying that the two factors have achieved an acceptable level of Discriminant validity. Another test for Discriminant validity was performed by comparing two models (correlated two-factor models versus perfectly correlated two-factor models). Table 2 shows that NNFI, PNFI, AGFI, and RMSR show poor fit for the perfectly correlated two-factor models, implying that the two factors, source credibility and content credibility have achieved Discriminant validity.

LISREL Statistics	Factors of Credibility	
	Source Credibility	Content Credibility
Variance Extracted	.55	.66
Squared Correlation Between two factors	0.27	
Composite reliability	.88	.88

Table 4 Evidence of Discriminant Validity of the Two Factors: Corporate Blogs

Finally, the composite reliability (internal consistency) of the measures of the two hypothesized factors is shown in Table 4. In each case, the composite reliabilities of the measures of the two hypothesized factors were high, ranging from 0.88.

6. Conclusions

It is imperative that researchers must evaluate the construct validity and reliability of the scales used to measure theoretical constructs before any predictive or explanatory conclusion can be drawn in their study. Specifically, researchers must address the following

questions: (1) how consumer use blogs as a source of information, (2) what specific information do they use in arriving at their purchase decisions, and (3) when do they use such information, first we must assess how credible do consumers perceive blogs as sources of information. The primary focus of the present study was to assess the convergent validity, Discriminant validity, and composite reliability of the scales used to measure two factors of credibility of blogs, namely, source credibility and content credibility. For this purpose we used a rigorous methodology known as structural equations methodology to obtain appropriate statistics to assess the construct validity. The preliminary results indicated that the scales have achieved satisfactory level of construct validity.

Future research effort should examine the underlying causes and consequences of the factors of perceived credibility with regard to blogs used by corporations. Such an effort can be helpful in developing blogs and their contents that can be perceived as credible by consumers. In addition, researchers need to examine the use of blogs as a source of information by consumers under various buying situations and its role in the entire value chain. Finally, a segmentation study can be performed to identify groups among blogs users and to develop their demographic and psychographic profiles. Such research effort can be useful in targeting blogs to specific groups of interest.

As with any research design, there are several caveats in the present study. One, the sample was a convenient sample. Two, the study was a cross-sectional and not longitudinal. Three, the limited sample size did not allow to take a hold-out sample for the purpose of cross validation of the results. Four, the present research used only one method (Semantic Differential Scales) to measure the credibility constructs. Hence there is a possibility of methods bias in the results. Ideally, one must use a multi-trait, multi-method approach to assess construct validity (Bagozzi 1980). Due to these caveats, the results of the present study cannot be generalized to other populations.

7. References

Bagozzi, R. P. *Causal modeling in marketing*. New York, NY: Wiley. (1980).

Baker, S. *The inside story on company blogs*. Accessed March 6, 2006, [available at <http://www.businessweek.com>].

Beltramini, R. F. *Perceived believability of warning label information presented in cigarette advertising*. *Journal of Advertising*, 17 (1): (1988). 26-32.

Bentler, P. M. & Bonnett, D. C. *Significant tests and goodness fit in the analysis of covariance structures*. *Psychological Bulletin*, 80: (1980). 588-606.

Blood, R. "Weblogs: A history and perspective", *Rebecca's Pocket*. 07 September 2000. Accessed on August 30, 2006 at www.rebeccablood.net/essays/weblog_history.html.

Bruner, G. C. & Hensel, P. J. *Marketing Scales Handbook: A compilation of Multi-Item Measures, Vol. II*. Chicago, IL: American Marketing Association. (1998).

BusinessWeek, May 2, 2006.

Dearstyne, B. W. *Blogs: the new information revolution?. The Information Management Journal*, September/October: (2005). 38-44.

DeFelice, A. *A new marketing medium. Customer Relationship Management*, December: (2006). 32-35.

Fornell, C. & Lacker, D. F. *Evaluating structural equation models with observed variables and measurement errors*. *Journal of Marketing Research*, 18: (1981). 39-50.

James, L. R., Mulaik, S. A., & Brett, J. *Causal analysis: Models, assumptions, and data*. Beverly Hills, CA: (1982). Sage.

Johnson, T. J. & Kaye, B. K. *Wag the blog: How reliance on traditional media and the internet influence credibility perceptions of weblogs among blog users*. *J&MC Quarterly*, (81 (3): (2004). 622-642.

Joreskog, R. G. & Sorbom, D. *LISREL: Analysis of linear structural relations by the method of maximum likelihood (Version VII)*. Chicago: National Education Resources. (1983, 1989).

Medsker, G. J., Williams, L. J., & Holahan, P. J. *A review of current practices for evaluating causal models in organizational behavior and human resources management research*. *Journal of Management*, 20 (2): (1994). 439-464.

Ng, Debra & Falkow, Sally. *Blogs – the new marketing strategy*. <http://www.melissadata.com/enews/marketingadvisor/articles/0704/2.htm>

Netermeyer, R. G., Johnston, M. W., & Burton, S. *Analysis of role conflict and role ambiguity in a structural equations framework*. *Journal of Applied Psychology*, 75 (2): (1990).148-157.

Quible, Z. K. *Blogs and written business communication courses: A perfect union*. *Journal of Education for Business*, July/August: (2005). 327-332.

"Taking the Pulse of the Healthcare Blogosphere: A global online survey of healthcare bloggers," *Envision Solutions and the Medical Blog Network*, December, 2006: at http://www.envisionsolutionsnow.com/pdf/Studies/Healthcare_Blogger_Survey_Report_doc.pdf