

# Web Architectural-Inducing Model (WA-IM) for Information Architecture in Cultural Context: An Empirical Investigation

Wan Abdul Rahim Wan Mohd Isa<sup>1</sup>, Nor Laila Md Noor<sup>2</sup>, Shafie Mehad<sup>3</sup>

<sup>1</sup>Systems Science Studies  
Faculty of Computer and Mathematical Sciences  
Universiti Teknologi MARA (UiTM)  
40450 Shah Alam  
Selangor, Malaysia  
[wrahim2@tmsk.uitm.edu.my](mailto:wrahim2@tmsk.uitm.edu.my)

<sup>2</sup>Systems Science Studies  
Faculty of Computer and Mathematical Sciences  
Universiti Teknologi MARA (UiTM)  
40450 Shah Alam  
Selangor, Malaysia  
[norlaila@tmsk.uitm.edu.my](mailto:norlaila@tmsk.uitm.edu.my)

<sup>3</sup>Quantitative Methods Studies  
Faculty of Computer and Mathematical Sciences  
Universiti Teknologi MARA (UiTM)  
40450 Shah Alam  
Selangor, Malaysia  
[shafie@tmsk.uitm.edu.my](mailto:shafie@tmsk.uitm.edu.my)



**ABSTRACT:** Website Information Architecture (IA) is primarily treated as a new discipline that is concerned with design principles and architecture of information in digital landscape. Proliferation of revolutionary models for interdisciplinary applications of IA, however lack theoretical perspectives, empirical evidence and cultural context. Here, we proposed a new model called Web Architectural-Inducing Model (WA-IM). The model was developed based from existing literature and available architectural proposition from prior work. We tested the model suggesting that website IA being conceptualized as multidimensional constructs by exploring the applicability of WA-IM to web localization process from a socio-cognitive cultural perspective. The research methodology involves a web-based survey on Muslim online user as the cultural case study where 427 usable international responses were accumulated. The construct validation of the multifactor structure of website IA was assessed via confirmatory factor analysis (CFA) by using structural equation modeling. AMOS 7.0 was used to evaluate the five factor hypothesis goodness fit model. The result revealed that website IA is indeed a multidimensional construct composed of five factors: content-information, content-trust, navigation-traits, navigation-wayfindings and context. We conclude our study by providing empirical evidence for WA-IM in a form of goodness-fit-structure as part of the localization process towards the creation of cultural information structure.

## Categories and Subject Descriptors

**D.2.11 [Software Architectures]; H.5.3 [Group and Organization Interfaces]:** Web-based interaction; **H.1 [Information Systems]:** Models and Principles

**General Terms:** Information Architecture, Information Models, Cultural application

**Keywords:** Information Architecture, Information Structure, Website Information Architecture, Human Computer Interaction

**Received:** 21 March 2010, Revised 13 May 2010, Accepted 20 May 2010

## 1. Introduction

Information Architecture (IA) can be referred to as the art and science of structuring and organizing information environments and space to maximize its accessibility and usefulness for users [2, 5, 39]. The practice of IA development by information architect for website is often seen as the organization of website's structure and content, the labeling, categorizing and indexing information and the design of navigation system to support searching and browsing information [39, 20, 21, 27].

The term 'Information Architecture' (IA) was coined by Wurman since 1975 [55] but IA for the web is still treated as a new field as it has been around for only a few years back. Basically, IA design methodology used by information architects is dependable on the user or sponsor vision or similar IA development cases that influence the practical selection of IA design principles for website development [23, 39]. The role of IA in the context of IA development is to arbitrate between the sponsor's vision and requirement and the user's mental model. Currently, the arbitration process is not fully supported by theoretical grounding especially in supporting the selection of design methods and principles [23]. As our understanding of the IA constructs matures, it should also be expected that we begin to ground these findings within a theoretical framework.

There are several IA models in various applications that contribute significantly to the development of IA. Examples will include the IA methodology from Rosenfeld and Morville developed in 1998 [9, 16, 39, 41], coordinating structure for library website [34], mobile internet [31], electronic record management [33], IA practices [3] and IA working model [9]. However, they are lacking in the theoretical perspectives and also empirical evidence in the model development. In addition, the relationship of website IA to other disciplines are quite ambiguous. Without its own tradition, standards and literature, it borrows heavily from library science, computer science, knowledge management, interaction design, information design, graphic design, usability,

content development and wayfinding [28]. Thus, website IA is primarily treated as an apprentice to existing discipline and seeks to benefits from establish practices and theories and even from the architectural perspectives.

The idea of seeing information as a site of architectural design was first proposed by an architect, Wurman in 1975 [13, 24, 40]. Wurman took an information design approach to IA whereas Rosenfeld and Morville came to the field with library and information science approaches [18, 35, 53]. Even so, the perception attached to the IA is still going strong to be predisposed by the sense of architectural paradigm. In fact, Rosenfeld (2000), had broaden the definition and backed away from mentioning specific architectural system, such as organization, navigation, labeling and searching, as continually find more to architecture than those systems cover [38]. Therefore a proper architectural formalism is imperative towards IA becoming a discipline of its own.

On the other hand, there are ongoing demands on research areas that are oriented on better understanding of indigenous people by studying the cultures from within and between culture, technology and society [29, 44]. One of the aforementioned research areas is IA. Cultural differences in IA and user preferences for sites created by designers from their own cultures still lacks cross cultural investigation [6, 8, 14]. In addition, the problem also lies when IA is highly disregard by website designer in cultural specific website [45]. However, effort is also seen on drawing Islamic culture into the theoretical framework of website information architecture [48].

Here, we proposed a new model called Web Architectural-Inducing Model (WA-IM) for information architecture in the culture context for the construction and localization process of website IA. The model was formulated based on the derivation of prior work of drawing architecture theoretical propositions for studying website IA phenomenon [46, 47] and relevant empirical investigation [49, 50]. The main objective of this study is to explore the applicability of the proposed model to web localization process from a socio-cognitive cultural perspective. The research methodology involves a web-based survey on Muslim online user as the cultural case study. Our model contribute to IA domain as it revealed motivating factors of using website IA from the user socio-cognitive perspective. This study evaluates the construct validity of the website IA utilizing confirmatory factor analysis (CFA). This model is different from the popularized IA methodology from Rosenfeld and Morville developed in 1998 [9, 16, 39, 41], as their model was driven from information architects or practitioners perspectives but the model that we are proposing are based on user perception and perspectives. In addition, as IA borrows heavily from information science, library science, information design and others [28], the underlying dimensions of using IA need to be determined.

The objectives of current exploratory study are as follows:

- to gain a clearer understanding of salient factors (motivating factors) of using website IA
- to generate an integrative, basic model for using website IA based on selected items derived from inductive and deductive reasoning.
- to integrate the theory drawn from existing work and related literature into a comprehensive model useful for localization process from socio-cognitive perspectives.
- to verify the multidimensionality factor of using website IA.

- and most importantly, to gauge the extent to which the constructs in the integrated model "fit" empirical data by assessing the dimension properties of the corresponding measurement model.

In pursuit of these main goals, this paper theorized on a new model, WA-IM and proposes three main research questions.

- RQ1. What are the salient factors (motivating factors) of using website IA?
- RQ2. How do the salient factors of IA enhance the explanatory power of using website IA?
- RQ3. Does the proposed model provide a good fit with the accumulated survey data?

The breakdown of the paper is seen as the following. Section 2 will briefly describe research paradigm taken from a socio-cognitive cultural perspective. Section 3 discusses our proposed WA-IM, prescribed by the website IA domain. Section 4 and 5 discuss in detail of our research methodology and data finding. Lastly, section 6 draws the conclusions and discuss future works and implications of the study to theory and practice.

## 2. Research Framework – Localization from Socio-Cognitive Cultural Perspective of the User

The localization study involves in this research was based on the theoretical approach drove from the work of Faiola et al. (2006), that addresses Cultural Cognition Theory (CCT) within the domain of Human Computer Interaction (HCI) [15]. CCT frames the concept that, culture profoundly influences the contents through shared knowledge structures and effect the design and development of website [14]. The notion of CCT makes a more explicit connection among culture, cognition, information organization and website design [15, 43].

User preferences are culturally determined by the socio-cognitive perspective. CCT was addressed to form the theoretical understanding for this presumption. It is imperative to understand how the mind works with structural design elements [52], as the fault of design can be due to the lack of effort to identify the user's conceptualization of information space [11]. Thus, by using the CCT as the theoretical premise of the study, we derived and employed WA-IM as part of the localization process for website IA. We used Islamic culture as the case study for the localization process. The explanations of the model can be seen in the next section.

## 3. Research Model – The Dimensionality of Website IA

The inductive and deductive reasoning were used to derive the research model. The method begins by synthesizing related works on IA, by using inductive reasoning. Deductive reasoning was later applied as suggested by Hyde (2000) [25] to provide the explanatory power of architectural propositions into the dimensions of website IA. By using the prior studies [46, 47] as the theoretical grounding consideration, we then make inferences to related literatures and items on different aspects of website IA as shown in Table 1. Then, the model is to be tested from the socio-cognitive culture perspectives. The hypothesis is stated as:

- H<sub>1</sub>: Website IA is multidimensional constructs of 'content - information', 'content - trust', 'navigation - trait', 'navigation -wayfinding' and 'context - information design'.

Dimensions	Characteristics	Description
Content-Information (Represented information) [2]	Info Availability	Availability of relevant data
	Info Quantity	Sufficient information
	Info Organization	Organization of info for users
	Info Harmony	Rearrange items based on principles of balance, proportion, rhythm, unity
Content-Trust (the trust judgment placed on a piece of information) [19]	Validity (Specificity)	Precision of specific content as tends to engender more trust
	Reliability (Provenance)	Trust in the entities that generate content
	Credibility (Security / Privacy)	Security or privacy traits to avoid deceptive intention
Navigation-Trait (allow to navigate and find the information) [11, 20]	Info Format	Single format of information
	Structure (Remote navigation)	Overall hypertext structure such as 'site map'
	Main Topic	Element such as navigation bar, frames and menus
	Navigation Guide	Search tool or links as a guide for the user
	Cue Sign	Metaphor, icon and words, phrase provide structural cue/ signal
Navigation-Wayfinding (guiding people find things) [54]	Font	Form and information presentation to enhance recognition
	Sign (Signage)	Information as signs or symbols
	Transition Zone	Different arrangement of elements to indicate separate page or zone
	Point of Entry	Entrance door or exit
Context-Information Design (cultural environment and adds meaning) [2]	Info Quality (Appearance)	Design, 'site layout', grammar and spelling to judge content accuracy
	Label Name	Labels as form of ubiquitous representation
	Color	Color to delineate webpage layout
	Placement	Page layout order

Table 1. Website IA constructs [46, 47]

The WA-IM consists of multidimensional constructs of five factors. The model includes 20 items of website IA that are summed for use in the five dimensions of website IA. The proposed model consists of five interrelated but distinct factors. These factors are measured as perceptions in the constructed questionnaire. Before any discussion on how we apply and test the model, the dissection of the model and list of the component parts can be seen as shown in Table 1.

With the premise understanding of WA-IM constructs, a web-based survey was conducted by using Muslim online user as the cultural case study. Our research examines this model and designed to test the multidimensionality of the theoretical construct, subjected for localization process of web information structure from a socio-cognitive cultural perspective. Specifically, we tests the hypothesis that website IA is a multidimensional construct composed of five factor: 'Content-Information', 'Content-Trust', 'Navigation-Traits', 'Navigation-Wayfindings' and 'Context-Information Design'.

We suggest that the WA-IM to be conducive not only for the construction process for website IA but also for any localization strategy that may be imposed into the information structure based on the cultural context. Using a structural equation modeling approach, a five factor hypothesis goodness-fit-model was then evaluated by using AMOS 7.0. Confirmatory factor analyses supported the multidimensional nature of using website IA and generally initiated the factor structure with some notable exceptions. Essentially, the present findings were aligned with prior theoretical models. Findings are discussed in terms of implications for further development and use of measure. The empirical findings and discussion are shown in the next section.

#### 4. Research Methodology

##### 4.1 Subjects and Data Collection

A web-based explanatory survey was conducted on Muslim online user. In general, the explanatory survey research takes place when knowledge of a phenomenon has been articulated in a theoretical form using well-defined concepts, model and proposition [17, 36]. The survey was carried out with the specific aim of testing the adequacy of the concepts developed in relation to phenomenon under investigation. The growing number of Muslim population [12] and Internet penetration rate warrants us to use Muslim online user as the cultural case study [45]. To collect the Internet user's perception data, the web-based survey was available at <http://inforec.uitm.edu.my/perseus/se.ashx?s=0B7FD90F46C0BBE3> and accessible for the period of one month from March to April 2007.

Convenient sampling was used in the actual survey. Invitations were sent by using e-mails to Muslims, who have at least undergraduate qualification. The list was determined by using mailing list of universities in Islamic countries. Ensuring sample equivalency is an imperative methodological consideration in cross-cultural research and may refer to the inclusion of subject on similar educational level [30] as such undergraduate qualifications. Although the group was moderately large, it was, nonetheless, fairly homogenous. The sampling was based on the guideline of Roscoe (1975) where in a multivariate research, the sample size should be 10 times as large as the number of variables in the study [37, 42]. Since we have 20 items under investigation, we manage to collect responses of 603 which exceed the least minimum number of samples of 200 (20x10). Nevertheless, we excluded the cases of missing data (n = 176) and finally used 427 international responses for our analysis which still exceeds the least minimum number of samples of 200 (20x10) as prescribed by Roscoe (1975) [42].

Measure	Items	Frequency	%
Gender	Male	273	63.9
	Female	154	36.1
Age	Under 26	42	9.8
	26-35	152	35.6
	36-45	126	29.5
	Above 45	107	25.1
Region	Southeast Asia ( <i>Malaysia, Brunei, Indonesia</i> )	199	46.6
	Middle East ( <i>Saudi Arabia, Oman, Palestin, Jordan, Iran, Turkey, UAE, Qatar, Pakistan, Tajikistan, Iraq, Bahrain, Yemen, Lebanon</i> )	171	40.0
	South Asia ( <i>Bangladesh, India</i> )	10	2.34
	North Africa ( <i>Egypt, Sudan, Libya, Algeria, Morocco</i> )	18	4.22
	Others ( <i>United States, New Zealand, Australia, UK, Germany, Mauritius, Nigeria</i> )	12	2.8
	Not Answered	17	3.98
	(*Countries assorted to regions according to <a href="http://worldatlas.com/atlas/world.htm">http://worldatlas.com/atlas/world.htm</a> )		

Table 2. Descriptive statistics of the respondent profile

The initial screening eliminated incomplete responses to ensure the validity of the data. In addition, due to departures of normality of the data, the final samples also met the general accepted ratio of 15 respondents for each parameter 300 (15x20) as suggested by Hair et al (1998) for data that violate the assumptions of multivariate normality [22]. Table 2 summarizes some of the demographic attributes of the final respondents.

Data were then analyzed by using the Statistical Packages for the Social Sciences 15.0 (SPSS 15.0) application to conduct validity and reliability of measurement instruments and also normality test for the data distribution. Using Analysis of Moment Structure 7.0 (AMOS 7.0), a structural equation modeling (SEM) program, first-order confirmatory factor analysis (CFA) was performed to specify appropriate model for this research.

## 5. Results

### 5.1 Distribution of Data

A multivariate normal distribution for the data is an important assumption in SEM analyses such as CFA. Much of the underlying analysis of structural equation modeling relies on the assumption of the data having multivariate normal distribution [4]. First, the examination of univariate normality estimates namely the skewness and kurtosis, provides details of the distribution characteristics. If the existence of individual variables departing significantly from a univariate normal distribution, then the multivariate distribution cannot be normal [51]. In addition, the condition of univariate normality may not signifies multivariate normality [51] thus implies for multivariate normality test to be conducted.

Kline (1998) noted that multivariate non-normality can be detected through inspections of univariate distributions [32]. Univariate estimates of skewness and kurtosis were obtained through SPSS 15.0. Despite the adequately large sample of the sample, the data are non-normally distributed. Univariate skewness (SK) values range from 3.71 to 14.94 and univariate kurtosis (KU) values range from 0.03 to 19.34. Kline (1998)

argues that skewness values in excess of  $\pm 3$  and kurtosis values in excess of  $\pm 10$  represent significantly non-normal univariate distributions [32]. Furthermore, multivariate kurtosis was assessed by Mardia's test of multivariate normality which was provided by AMOS [4]. Byrne (2001) also noted that when estimated values are large, then the data are definitely multivariate non-normal [4]. Mardia's measure of multivariate kurtosis obtained from the findings is large at 201.835 with the critical ratio of 70.297. Based on the above guidelines, this implies that the data are significantly multivariate non-normal.

The bootstrapping procedure was employed due to the excessively kurtosis nature of the data, as recommended by Byrne (2001) [4]. The procedure which involves the selection of random samples with replacement from the sample data provides data for empirical evidence of the indexes of estimates and rendered free from the assumptions of data normality [4]. Arbuckle (1996) argues that in general, 500 bootstraps should be sufficient to determine the level of model stability [1].

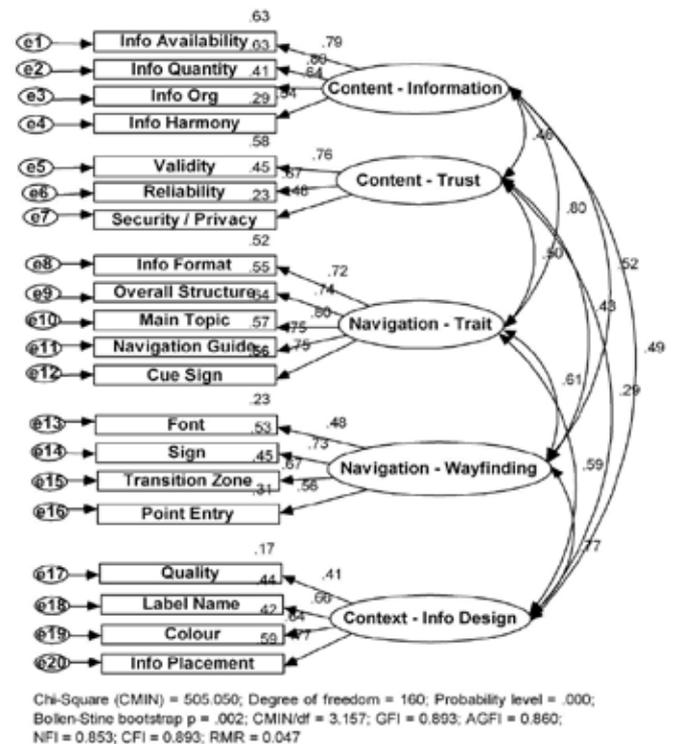


Figure 1. Initial First Order (Initial Model)

### 5.2 Model estimation and fit criteria

Structural equation modeling (SEM) with AMOS 7.0 was used with maximum likelihood estimation to test the fit of our hypothesized first-order factor model and examine the validity of the constructs. The model assessment was based on Maximum Likelihood Estimation (MLE) extraction combined with bootstrapping for CFA [4, 7] to obtain the parameter estimates. We follow the recommendations suggestion by Im and Grover (2003) on the assessment of overall goodness model fit diagnostic [26]. They suggested the assessment with one or more overall goodness-of-fit indices such as  $\chi^2$  statistic, goodness-fit index (GFI), adjusted goodness-fit index (AGFI), root mean residual (RMR), comparative fit index (CFI), Normed Fit Index (NFI) and non-normed fit index (NNFI).

The Chi-Square was used as an absolute index of fit to tests the lack of fit of the theoretical model tested. According to Byrne (2001), there are a few difficulties with respect of using the chi-square p statistic and its sensitivity to sample size [4]. The Chi

square / df statistic is considered a more appropriate measure and the attached assumption is that if each of the measurement models was less than 2.0, then measurement models fit the sample data well [26].

We follow the summarized acceptable cutoff values of goodness-of-fit index by Im and Grover (2003) [26]. A cutoff value of equal or more than .90 was used to consider the model well-fitting for GFI, CFI and NFI. In addition, the root mean residual (RMR) where recommended level of equal or below than 0.10 to achieve model fit [4] and AGFI was recommended to be equal or more than 0.80. Bootstrap estimation was provided by Amos 7.0. It produces the Bollen-Stine bootstrap 'p' statistic which is actually refers to the modification of the chi-square test. The program also adjusts for distributional misspecification of the model. Furthermore, if the Bollen-Stine bootstrap probability statistic  $p < 0.05$ , the model is rejected.

### 5.3 Evaluation of Model Fit- Initial First Order (Initial Model)

We examine a two stage of first-order CFA model designed to test the multidimensionality of a theoretical construct subjected for localization process of website IA from socio-cognitive cultural perspectives.

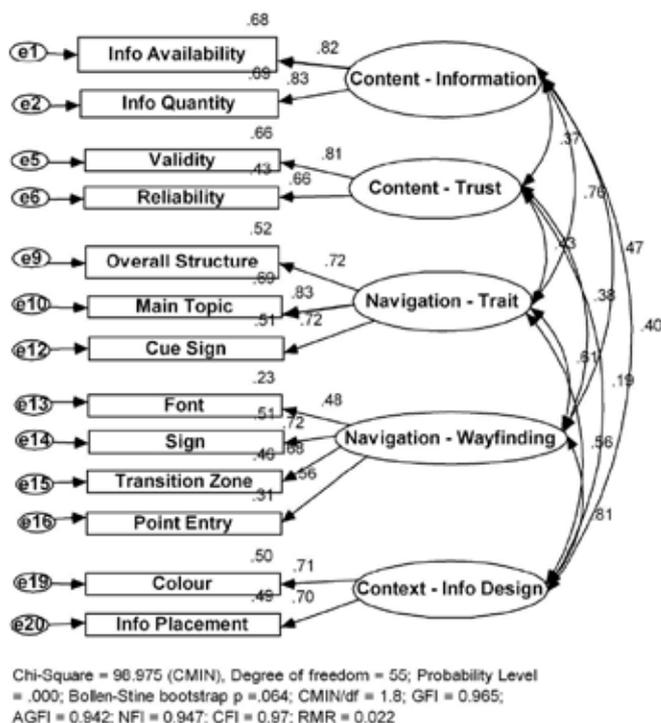


Figure 2. Final First Order (Empirical Model)

We tests the hypothesis that website IA is a multidimensional construct composed of five factor: 'Content-Information', 'Content-Trust', 'Navigation-Traits', 'Navigation-Wayfindings' and 'Context-Information Design'.

Fig. 1 shows the first stage of the result. It indicates a very poor fit of the initial model based on the comparison of the data with the general cut-off values accepted for the criteria, as discussed in previous section. The rectangles in Fig. 1 symbolize the observed variables and the ellipse circles as the latent constructs. Each measure is presumed to include random (uncorrected) errors symbolized by the short arrow entering each rectangle from the perimeter of the figure. The fit indices GFI = 0.893, NFI = 0.853 and CFI = 0.893 are all below 0.9, thus suggesting poor fit. In addition, the Chi-Square/df statistic for the measurement

of 3.157 ( $> 2$ ), suggests that the model does not fits the sample data well. Furthermore, to test the null hypothesis that the model is correct, the Bollen-Stine bootstrap statistic  $p = .002 (< 0.05)$  also indicates that the model should be rejected. Thus, model re-specification needed to be done to achieve apparent fit.

We adopt the Byrne method in pinpointing possible areas of misfits by examining modification indexes. AMOS 7.0 provides information that can be utilized to assess model misspecification and make decisions regarding the re-specification of model parameters (i.e., modification indexes) [4]. As suggested by Byrne (2001) [4], large modification indexes that postulate onto different parameter may accounts for substantial re-specification of the hypothesized factor loadings. The initial testing of the model revealed a poor fit to the model. Therefore, the second stage of our application involves a re-specification of the model, resulted in seven out of 20 items being deleted due to high values of modification indexes relating to covariance and regression weights. The re-specification model can be seen in the following diagram and final result is discussed.

### 5.4 Evaluation of Model Fit - Final First-Order (Empirical Model)

Using SEM, we found empirical support for the prevailing architecture theory that implies website IA consists of five dimensions. The re-specified model goodness-of-fit in above and other diagnostic information indicate a good fit and it is clear that  $H_1$  represents a much better fit to the data in Fig 2. When viewing the fit indices, the GFI = 0.965 and NFI = 0.947 and CFI = 0.976 are all exceeding 0.90, which suggest excellent model fit. The Chi-Square/df statistic for the measurement of 1.8 ( $< 2$ ) implies that the model fits the sample data. In addition, to test the null hypothesis that the model is correct, the Bollen-Stine bootstrap statistic  $p = .064 (> 0.05)$  also indicates that the model should be accepted. The indices of AGFI=0.942 ( $> 0.8$ ) and RMR = 0.022 ( $< 0.1$ ) also provide additional indications for the acceptance. These results provide the evidence that website IA is multidimensional and support our hypothesized five-factor model with the best fit. Fig. 2 shows a final schematic representation of the revised structural-goodness-fit model for WA-IM. Furthermore, we also predicted that the best model to fit our data would not include second order factor. This implies that not only the usage of website IA should be viewed as multidimensional but also that the different aspects of using website IA should be viewed as distinct. Based on our results, we are able to provide not only general measurement recommendations but also specific recommendations for researchers who plan to use our proposed dimensions in the future work.

## 6. Conclusions

The results from the SEM procedures supported the conceptualization of the usage of website IA as a multidimensional construct. The present paper proposed, for the first time, an integrative, basic model of structuring website IA, called, WA-IM. To our knowledge, this was the first study to test empirically model proposed in the dimensions of website IA. The research sought to explore the applicability of our proposed model WA-IM to web localization process from a socio-cognitive cultural perspective. To achieve the objective, this study was specifically designed to explore the issues of Muslims perceptions and expectations for using website IA in Islamic genre websites. We proposed WA-IM by drawing architectural theoretical propositions into the IA domain. The study was then undertaken in order to assess the factor structure of website IA. The model was further deduced with related IA literature to delineate specific instances for understanding website IA phenomenon.

The model was tested empirically with Muslim online users as the cultural case study. The results from a survey of 427 online users validate the re-specified WA-IM with five hypothesis good-of-fit factors. The re-specification process involved few modifications of the items to achieve apparent goodness-of-fit. The five factor hypothesis goodness fit model was evaluated by using AMOS 7.0 by using SEM. A confirmatory factor analysis on the re-specified model, indicate moderately acceptable fit and significant loading. Generally, the results favor the first-order model suggesting that website IA, at least as represented in this study data set, is multidimensional. The evolution of the model from the conceptual stage to the revised empirical version is reported here in this paper where the findings attested and refined the constructs for the WA-IM as part of the localization process for cultural-specific websites. The final model indicates that five WA-IM main constructs of Content-Information, Content-Trust, Navigation-Traits, Navigation-Wayfindings and Context-Information Design are important in website IA design for the localization process of cultural website.

We believe that the main value of this study is in its contribution to the building body of knowledge in website IA domain. In addition, there are several important implications of our study for research and practice. Although, this research is considered as exploratory in nature, it is considered as one of the most comprehensive assessment of website IA as it provides theoretical and empirical grounds. The theoretical grounding perspectives of a new model for website IA domain was being reflected by this study. The foundation of the model was depicted by the adaptation of prior architectural theoretical propositions as the base framework. The attempt was conducted as the arbitrary process for website IA in the selection of design methods and principles, is not fully supported by theoretical grounding consideration. Therefore, the WA-IM prescribed in our study is strongly supported with architectural theoretical base framework as the arbitrary platform for the construction and localization process of website IA. This exploratory research is to obtain the understanding about the underlying phenomena about an under-explored concept of using website IA from user perspective.

However, there are limitations and constraints imposed by the WA-IM for the localization process of cultural-specific web study. For example, the localization process imposed on WA-IM was entirely based on Culture Cognition Theory (CCT) under the assumptions that user preferences are culturally determined by socio-cognitive perspective. However, the behavioural aspect of the community was not examined due to the exploratory stage of the study. Future localization research may adapt the model alongside with the behaviorist tradition where web design may be addressed from socio-behavioral perspectives. Diverse culture theories may be consumed to determine the behavioural level and patterns for the localization process of website design as a complementary approach to the localization process of website IA.

Our model provides a starting point for future research, and adds to the growing body literature of IA. However, the salience of dimensions may vary based on the type of genre website and cultural background of the user. The findings of this study can help practitioner understand and shape the perceptions of the user rather than the outwardly manifested behaviour of using website IA. Thus, we suggest researchers and practitioners first decide which aspects of IA dimensions are important for their purposes and then take action to collect information about those particular aspects from multiple resources. Researcher might find exploring the dimensionality of website IA in our work to be a continuing line of fruitful inquiry. We hope that our work will continues to encourage researchers to move beyond the

nature of our work on the user perspectives while at the same time prioritizing focus for researchers and practitioners. These approaches are necessary and useful and together they will lead us to a better understanding of website IA.

## References

- [1] Arbuckle, J. L. (1996). Full Information Estimation in the Presence of Incomplete Data, *In: G. A. Maccouides, R. E. Schumacker (eds.), Advanced Structural Equation Modeling: Issues and Techniques*, Lawrence Erlbaum Associates.
- [2] Beiers, H. (2000). Information Architecture's Potential Contribution to an Asynchronous Learning Environment. *In: Proc of the International Workshop on Advanced Learning Technologies*, Palmerston North, New Zealand, pages 253 - 254.
- [3] Busch-Geertsema, B., Balbo, S., Murphy, J., Davey, S. (2005). Towards a Framework to Analyse Information Architecture Work Practices. *In: Proc of the OZCHI 2005*, Canberra.
- [4] Byrne, B. M. (2001). *Structural Equation Modeling with Amos: Basic Concepts, Applications and Programming*, Lawrence Erlbaum Associates.
- [5] Byrne, T. (2004). *Enterprise Information Architecture: Don't Do ECM Without It*, Econtent.
- [6] Choong, Y.-T. Plocher, T., Rau, P.-L. P. (2004). Cross-Cultural Web Design, *In: R. W. Proctor (ed.), Handbook of Human Factors in Web Design*, Lawrence Erlbaum Associates Incorporated, 284-300.
- [7] Cole, J. C., Motivala, S. J., Dang, J., Lucko, A., Lang, N., Levin, M. J., Oxman, M. N., Irwin, M. R. (2004). Structural Validation of the Hamilton Depression Rating Scale. *Journal of Psychopathology and Behavioural Assessment*, 26, 241-254
- [8] Cunliffe, D., Jones, H., Jarvis, M., Egan, K., Huws, R., Munro, S. (2002). Information Architecture for Bilingual Web Sites, *Journal of American Society for Information Science and Technology*, 53 (10) 866-873.
- [9] Denn, S. O., Maglaughlin, K. L. (2000). World's Fastest Modeling Job or Information Architecture: What Is it? The Multidisciplinary Adventures of Two Ph.D. Students. *Bulletin of the American Society for Information Science*.
- [10] Dijck, P. V. (2003). *Information Architecture for Designers: Structuring Websites for Business Success*. RotoVision.
- [11] Dillon, A., McKnight, C., Richardson, J. (1993). Space - The Final Chapter: or Why Physical Representations are Not Semantic Intentions. *In: A. D. C. McKnight and J. Richardson (eds.) Hypertext: A Psychological Perspectives*, Ellis Horwood. 169-192.
- [12] Evans, H. A. (2005). Halal Meat - A Global Product in a Global Market. *The Halal Journal*.
- [13] Evernden, R., Evernden, E. (2003). *Information First: Integrating Knowledge and Information Architecture for Business Advantage*. Elsevier Butterworth Heinemann.
- [14] Faiola, A. (2006). Toward an HCI Theory of Cultural Cognition. *In: C. Ghaoui (ed.) Encyclopedia of human-computer interaction*, Hershet, PA: Idea Group. 70-77.
- [15] Faiola, A., Matei, S. A. (2006). Cultural Cognitive Style and Web Design: Beyond a Behavioral Inquiry into Computer-Mediated Communication. *Journal of Computer-Mediated Communication* 11, 375-394.
- [16] Farnum, C. (2002). Information Architecture: Five Things Information Managers Need to Know. *Information Management Journal* 36 (5), 33-40.

- [17] Forza, C. (2002). Survey Research in Operations Management: A Process-Based Perspective. *International Journal of Operations & Production Management* 22 (2) 152-194.
- [18] Fraser, J. (2004). Interfaces: Expressions of IA. In: A. Gilchrist and B. Mahon (eds.). *Information Architecture: Designing Information Environments for Purpose*, Facet Publishing.
- [19] Gil, Y., Artz, D. (2006). Towards Content Trust of Web Resources. ACM.
- [20] Greunen, D. V., Wesson, J. L. (2004). Exploring Issues for Information Architecture of Web-Based Learning in South Africa. In: Proc of the SAICSIT 2004, Western Cape, South Africa. 73-78.
- [21] Gulzar, N. (2003). *Practical J2EE Application Architecture*: McGraw-Hill Osborne.
- [22] Hair, J. F., Anderson, R. E., Tatham, R. L., Black, W. C. (1998). *Multivariate Data Analysis*. Prentice Hall.
- [23] Haverty, M. (2002). Information Architecture Without Internal Theory: An Inductive Design Process. *Journal of the American Society for Information Science and Technology*, 53, 839-845.
- [24] Honeycutt, L., McGrane, K. (2005). Rhetoric and Information Architecture as Pedagogical Framework for Website Design. In: *Technical Communication and the World Wide Web*, C. S. Lipson (ed.). Lawrence Erlbaum Associates.
- [25] Hyde, K. F. (2000). Recognising deductive processes in qualitative research. Emerald Library
- [26] Im K. S., Grover, V. (2003). The Use of Structural Equation Modeling in IS Research: Review and Recommendations. In: M. E. Whitman (ed.). *Handbook of Information Systems Research*, Idea Group Inc, 44-64
- [27] Jadav, A. D. (2003). *Designing Usable Web Interface*. Prentice Hall.
- [28] Kalbach, J. (2003). IA, Therefore I Am. *Bulletin of the American Society for Information Science*.
- [29] Kampouri, M., Bednarik, R., Tukiainen, M. (2006). The Expanding Focus of HCI: Case Culture. ACM.
- [30] Karahanna, E., Evaristo, R., Srite, M. (2003). Methodologies Issues in MIS Cross-Cultural Research. In: M. E. Whitman (ed.). *Handbook of Information Systems Research*, Idea Group Publishing.
- [31] Kim, H. Kim, J., Lee, Y. (2005). An Empirical Study of Use Context in the Mobile Internet, Focusing on the Usability of Information Architecture. *Information System Frontier*. 7 (2) 175-186.
- [32] Kline, R. B. (1998). *Principles and Practice of Structural Equation Modeling*. Guilford Press.
- [33] Maclachlan, L. (2004). From Architecture to Construction: The Electronic Records Management Programme at the DTI. In: A. Gilchrist and B. Mahon (eds.) *Information Architecture: Designing Information Environments for Purpose*. Facet Publishing, 199-214.
- [34] Maloney, K., Bracke, P. J. (2004). Beyond Information Architecture: A Systems Integration Approach to Web-site Design. *Information Technology and Libraries*.
- [35] Morville, P. (2004). A Brief History of Information Architecture. In: A. Gilchrist and B. Mahon (eds.) *Information Architecture: Designing Information Environments for Purpose*, Facet Publishing.
- [36] Pinsonneault, A., Kraemer, K. L. (1993). Survey Research Methodology in Management Information Systems: An Assessment. *Journal of Management Information Systems*, 10 (2) 75-106.
- [37] Roscoe, J. T. (1975). *Fundamental Research Statistics for the Behavioral Sciences*: New York, Holt, Rinehart and Winston.
- [38] Rosenfeld, L. (2000). Information Architecture Practice: An Interview with Lou Rosenfeld, Argus Associates, Inc. *Bulletin of the American Society for Information Science*, 26, 19-21.
- [39] Rosenfeld, L., Morville, P. (1998). *Information Architecture for the World Wide Web*. O' Reilly.
- [40] Salvo, M. J. (2004). Rhetorical Action in Professional Space: Information Architecture as Critical Practice. *Journal of Business and Technical Communication*.
- [41] Salvo, M. J. (2005). Teaching Information Architecture: Technical Communication in a Postmodern Context. In: C. S. Lipson (ed.). *Technical Communication and the World Wide Web*, Lawrence Erlbaum Associates, p. 61-79.
- [42] Sekaran, U. (2003). *Research Methods for Business*. John Wiley and Sons.
- [43] Shen, S.-T. Woolley, M., Prior, S. (2005). Towards Culture-Centred Design. *Interacting with Computers*, 18 (4) 820-852.
- [44] Sun, H. (2001). Building a Culturally-Competent Corporate Web Site: An Exploratory Study of Cultural Markers in Multilingual Web Design. ACM.
- [45] Wan Abdul Rahim, W. M. I., Nor Laila, M. N., Shafie, M. (2005). Towards Conceptualization of Islamic User Interface for Islamic Website: An Initial Investigation. In: Proc. of the International Conference on Information & Communication Technology for the Muslim World (ICT4M), *Kuala Lumpur, Malaysia*.
- [46] Wan Abdul Rahim, W. M. I., Nor Laila, M. N., Shafie, M. (2006). Towards a Theoretical Framework for Understanding Website Information Architecture. In: Proc of the 8th International Arab Conference on Information Technology (ACIT' 2006), Yarmouk University, Irbid, *Jordan*.
- [47] Wan Abdul Rahim, W. M. I., Nor Laila, M. N., Shafie, M. (2007). Incorporating the Cultural Dimensions into the Theoretical Framework of Website Information Architecture. In: N. Aykin (ed.) *Usability and Internationalization, Part 1, HCI 2007, LNCS 4559*, Springer-Verlag Berlin Heidelberg, p. 212-221.
- [48] Wan Abdul Rahim, W. M. I., Nor Laila, M. N., Shafie, M. (2008a) Inducting the Dimensions of Islamic Culture: A Theoretical Building Approach and Website Information Architecture Design Application, In: C. W. Khong, C. Y. Wong, B. V. Niman (eds.), *21st International Symposium on Human Factors in Telecommunication: User Experience of ICTs*, Prentice Hall, 89-96.
- [49] Wan Abdul Rahim, W. M. I.; Nor Laila, M. N.; Sharifah Sakinah, S. H. A. (2008b) Culture influences to website information architecture: An empirical investigation, In: Proc of the International Symposium on Information Technology, 2008. ITSIM 2008, 1.
- [50] Wan Abdul Rahim, W. M. I.; Nor Laila, M. N.; Shafie, M. (2009) The Information Architecture of E-Commerce: An Experimental Study on User Performance and Preference, In: G. A. Papadopoulos, W. Wojtkowski, W. G. Wojtkowski, S. Wrycza, J. Zupancic, J. (eds) *Information Systems Development: Towards a Service Provision Society*, 2, Springer-Verlag: New York.

[51] West, S. G., Finch, J. F., Curran, P. J. (1995). Structural Equation Models With Nonnormal Variables. *In*: R. H. Hoyle (ed.) *Structural Equation Modeling: Concepts, Issues and Applications*, 56-75.

[52] White, M. (2002). Behind the Firewall: Information Architecture and Usability, Econtent.

[53] White, M. (2004). Viewpoint: Information Architecture, *The Electronic Library*, 22, 218-219.

[54] Wodtke, C. (2003). *Information Architecture: Blueprints for the Web*: New Riders Publishing.

[55] Wurman, R. S. (2001). *Information Anxiety 2*. Que.

### Authors Biographies



**Wan Abdul Rahim Wan Mohd Isa** is currently a full time lecturer at the Systems Science Studies, Faculty of Computer & Mathematical Sciences, UiTM Malaysia. He received his MBA (IT Management) and PhD in IT from Universiti Multimedia, Malaysia and UiTM Malaysia in 2005 and 2009, respectively. His research areas include but are not limited to Human Computer Interaction, Information Architecture, Cultural Usability, IT Management and Cultural User Interface.



**Nor Laila Md Noor** is Associate Professor at the Systems Science Studies, Faculty of Computer & Mathematical Sciences, UiTM Malaysia. She is currently the Coordinator for Master of Science (IT) Programme, and the head of HCI - Special Interest Group, UiTM Malaysia. She was also the former Chairperson for Systems Science Studies, UiTM. She received her PhD in Computer Science from Universiti Kebangsaan Malaysia (UKM), Malaysia in 1999. Her main research interest include but are not limited to Human Computer Interaction, Business IT and Knowledge Engineering.



**Shafie Mehad** is Associate Professor at the Quantitative Methods Studies, Faculty of Computer & Mathematical Sciences, UiTM Malaysia. He was the former dean of Faculty of Computer and Mathematical Sciences, UiTM Malaysia. He received his MBA (Econometrics and QM) from Catholic Univ Leuven & MIS from UK. His main research interest include but are not limited to Human Computer Interaction, Econometrics and Quantitative Methods.