

Impact of Culture Dimensions Model on Cross-Cultural Website Development

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Abstract: In the cross-cultural website design literature, three strategies are often mentioned: globalization, internationalization and localization. Most cited are the localization and the internationalization. To develop localised websites for different cultures two models are widely applied. One is the culture marker model, and the other is the culture dimensions model. Marker model identify system elements (i.e. calendar, language, date formats) that require modifications. Since introduction of this model, authors have widely applied marker identification for cross-cultural system design. Culture dimensions model includes multiple subordinate models or cultural dimension models that have been derived from previously published cultural META models. With the culture models and dimensions included in these models, authors try to analyse and compare various cultures in order to acquire internal characteristics of target cultures. However culture dimensions model application in information and communication technology field for system development is still questionable. There is a need to perform more research on application of this model for development of methods for more usable and accessible website design. The aim of this article is to perform literature review on impact of culture dimensions model on cross-cultural website development for further development of application methodologies. It can be concluded that analysis of the culture dimensions (particularly Hofstede model) facilitates the process of gathering culture preferences and identification of evaluation methods for target users and can be applied for cross-cultural website design. Culture dimensions affect website's graphical information, design of navigation, design of text, creation of interaction elements, and design of input elements.

1 INTRODUCTION

Localization and internationalization of information systems is crucial, since expansion of globalization processes allow businesses to reach wide audience worldwide (Callahan 2006b; Gould and Zakaria 2000; Salgado et al. 2011). Multinational corporations, universities, governments and others try to address users from various countries and cultural backgrounds. Only 8-10% of the world population and 35% of website users use English as their primary communication language (Aykin 2005; Takasaki and Mori 2007).

People from various cultures not only speak different languages, but also think and act differently. This statement is proven in researches from various scientific fields, including information and communication technology (ICT) (Rau et al. 2011; Reinecke and Gajos 2011). Two models are

widely applied for cross-cultural web system development (Ying 2007). One is the culture marker model, and the other is the culture dimensions model (Ying 2007).

Cross-cultural website elements that require modifications are called the cultural markers. This term was introduced by Barber and Badre (Barber and Badre 1998). Since then, other authors have also widely applied this model and admitted that marker identification and modification is accessible solutions for cross-cultural website design (Fitzgerald 2004; Smith et al. 2004; Kondratova et al. 2007). Culture dimensions model includes multiple subordinate models or cultural dimensions that have been derived from previously published cultural meta models (Ford and Kotze 2005) and in combination with culture marker model could further improve the cross-cultural website development process.

The aim of this article is to perform literature review on impact of culture dimensions model on cross-cultural website development for further development of application methodologies.

2 EXISTING CULTURE DIMENSIONS MODELS FOR APPLICATION TO WEBSITE DEVELOPMENT

Since the bloom of World Wide Web (WWW), website developers introduce multiple guidelines for website development with improved usability. Only around year 2000 more and more research appeared that address the cross-cultural usability issues. There are guidelines for localization also from software developers, for example Microsoft has internationalization guidelines that address image content, layout of graphics, etc. (Kamppuri 2011). Mostly these guidelines are derived from the cultural marker model application researches (Aykin and Milewski 2005; Rau et al. 2011; Vitols et al. 2012). Another existing model is culture dimensions model.

Culture dimensions are basically culture models that are emerged from statistical analyses of large studies executed in various countries (Kamppuri 2011). Sources for culture dimensions are mainly anthropological theories and models (Regan 2005). For example, a well-known dimension for culture comparison is the "context dimension" presented by Hall.

In the ICT field there have been attempts to create a format that would allow analysing and translating culture characteristics for improved development process of information systems. The idea about the relation between cultural dimension and information system design for the first time was introduced by Marcus and Gould (Marcus and Gould 2000). In the last 60 years more than 25 various culture analysis dimensions have been identified (Schadewitz 2009; Alostath et al. 2009). However, for information system design Hall and Hofstede dimensions are most researched and applied (Singh and Baack 2004; Sondergaard 1994; Pavlou and Chai 2002; Reece et al. 2010; Callahan 2006b; Robbins and Stylianou 2003; Gould and Zakaria 2000; Jablin and Putnam 2001; Ying and Lee 2008; Choi et al. 2005; Leidner and Kayworth 2008; Gevorgyan and Manucharova 2009; Knight et al. 2009; Kale 2006; Ford and Gelderblom 2003; Wurtz 2005; Xinyuan 2005; Simon 1999; Duygu Bedir Eristi 2009).

In studies on designing the cross-cultural web pages, one more dimension has been introduced and applied which is cognitive styles in various cultures, especially related to information layout (Nishbett 2003; Matsuda and Nishbett 2001; Nishbett and Miyamoto 2005; Cui et al. 2015; Vatrapu and Suthers 2007; Ying and Lee 2008). Ying and Lee in their study (Ying and Lee 2008) show that people from various cultures browse websites contents in different ways and that this difference is closely related to the culture cognitive style. These authors, based on data about how people from various cultures browse WWW, divide cultures into two groups: "analytically thinking" and "holistically thinking". This division has already been known for many years in psychology field. Nishbett was the person who widely started to use it in his cross-cultural studies (Matsuda and Nishbett 2001; Nishbett 2003; Nishbett and Miyamoto 2005).

Hall suggested (Hall 1976; Hall 2000; Hall 1959) to compare cultures based on communication styles. Hall defined the following dimensions:

- Time;
- Space;
- Context;
- Message speed.

From Hall dimensions, context and time dimensions are mentioned for application for cross-cultural system design (Marcus and Rau 2009; Wurtz 2005; Isa et al. 2007).

From these models, the Hofstede model and its 5 dimensions are most applied for cross-cultural system analysis, requirements gathering and usability evaluation. This model is also most cited (Kamppuri 2011) and when searching this model application in computer science field in SCOPUS database since beginning of index until September 2017, it can be seen that model has been applied in more than 350 studies. Hofstede defined 5 dimensions (Hofstede et al. 2010) derived from analysis of 76 countries as follows:

- Power distance;
- Individualism versus collectivism;
- Masculinity versus femininity;
- Uncertainty avoidance;
- Long-term versus short-term orientation.

In 2010 Hofstede also added sixth dimension to the model Indulgence versus Restraint. However as there is a limited research on this recently added dimension and dimension can be considered ambiguous, analysis of this dimension is omitted in this research.

3 HOFSTEDE CULTURE DIMENSIONS MODEL FOR APPLICATION TO WEBSITE DEVELOPMENT

In this section existing literature on Hofstede culture model application for website development are analysed.

For literature analysis articles from Computer Science field in SCOPUS database has been selected. Keywords “culture models website development” has been used to identify set of articles for analysis.

Hofstede provides dimension calculations, acquiring numerical evaluation for each of the dimensions for most of the World cultures. Such evaluation allows researchers to apply these dimensions in various science fields more easily.

Hofstede culture model impact for cross-cultural website development results are summarized in Table 1. Dimension calculations can be interpreted variously to define which is high or low, for example power distance culture.

Power Distance. From analysed publications, results shows that high power distance dimension have impact on people preference to content. For example websites from high power distance require more information about administration and hierarchy of the organisation or owner of the website (Gevorgyan and Manucharova 2009). Also developers should include symbolic emphasis on social and national order. Power distance systems also include more locked and controlled access sections which are visible for other users (Marcus and Gould 2000; Marcus and Krishnamurthi 2009). High power distance cultures (i.e. Malaysia), also have more emphasis on person biographies, organisational charts, welcome speech from owners of the website, rector of university, head of organisation, etc., formal logos and certificates. (Robbins and Stylianou 2003; Ahmed et al. 2009; Callahan 2006a). Developers should pay attention to text content as high power distance cultures pay attention to proper application of person titles (Ahmed et al. 2009). Low power distance cultures prefer more navigation and control on website or system. Such cultures prefer 24 hour support, availability to input feedback (i.e. questioners, reviews), podcasts, RSS and equivalent services (Gevorgyan and Manucharova 2009).

Individualism Versus Collectivism. Collective cultures prefer web systems that have functionality to join groups and support many to many

communication style (i.e. web forums, public chats, loyalty programmes, social network integration) (Gevorgyan and Manucharova 2009; Li et al. 2011; Kuljis and Halloran 2010; Pfeil et al. 2006) Collective cultures prefer more localised content and non-localization can impact e-commerce performance particularly in high collectivism culture (Jarvenpaa et al. 2006; Kang 2009) Collective cultures pay more attention to elements that represent other people opinion, such as popularity charts (i.e. most downloaded mobile application, most viewed video), other people opinion on product or service (Choi et al. 2005). Collective cultures prefer introduction page of web system, while cultures where individualism dominate, such page is considered redundant (Kim et al. 2009; Nielsen 1999). Individualist cultures prefer more content where single person story and success is emphasized, while collective cultures prefer more images and group photos from various situations of life with emphasis of history, experience and tradition (Wurtz 2005; Callahan 2006a; Marcus and Gould 2000; Marcus and Alexander 2007). Element layout for high individualism cultures is more asymmetric while collective cultures prefer symmetrical layout.

Masculinity Versus Femininity. Masculine cultures prefer website content with such elements as company annual reports, financial success stories and images with objects (Robbins and Stylianou 2003) while feminine cultures prefer more images with people (Callahan 2006a). Masculine cultures also prefer web content orientated to traditions, gender, family and age differences as well as content put emphasis on competition in various fields (Marcus and Gould 2000; Kale 2006). In contrast more feminine cultures do not emphasise gender role, rather website aesthetics, impact on environment and elements that offer collaboration (i.e. comments, adding content, chatting) are valued (Marcus and Gould 2000; Kale 2006).

Uncertainty Avoidance. Cultures where uncertainty avoidance is higher are more cautious for online purchases and websites that has less description and more exploratory design in contrast cultures with low uncertainty avoidance does not have significant impact of less descriptive content (Vishwanath 2003). For example South Korean (high uncertainty avoidance culture) charity websites always include detailed description for donation, in the same time English versions of these websites does not include detailed descriptions (Kuljis and Halloran 2010). High uncertainty avoidance cultures prefer more secure websites with explained security policies

(Kale 2006), clear and simple web content with limited choices, more explanation about website elements, such as what will happen when you press button, simple navigation structures and application of colours and animation to keep users browsing experience clear and understandable. (Marcus and Gould 2000; Marcus and Gould 2001). For example high uncertainty cultures (i.e. Korea, Japan) Facebook has less uncertain elements and functions, such as button "People you may know" while such functionality is available to low uncertainty cultures (i.e. United States) (Marcus and Krishnamurthi 2009).

In contrast low uncertainty avoidance cultures typically have more complex navigation structure, wide choice options for selection, saturation of various elements that does not have clearly described outcome, such as popup window can suddenly open (Marcus and Gould 2000).

Long-term Versus Short-term Orientation. Long-term oriented cultures prefer websites with availability of search engines, navigation map, frequently asked questions and history of website (Robbins and Stylianou 2003). Content of long-term oriented cultures have more message and structure emphasis on practical value of product or service, time investment to reach the aim (Marcus and Gould 2000).

Table 1: Hofstede culture model impact for cross-cultural website development.

Website elements	Dimensions				
	Power distance	Individualism versus collectivism	Masculinity versus femininity	Uncertainty avoidance	Long-term versus short-term orientation
Elements layout	+	+	-	-	-
Use of proper language	+	-	+	+	+
Graphics elements contents	+	+	+	+	+
Navigation structure	-	+	+	+	+
Interaction options	-	+	+	-	-
Design aesthetics	-	-	+	-	-

Short term oriented cultures prefer content that emphasizes truth and fast message delivery, for example users must immediately understand the purpose and value of website. In e-commerce research it can be seen that users from short term

oriented cultures prefer to see single good representation of product or service – image or video while long-term oriented cultures need more images about product, purpose of product and application scenarios (Marcus and Alexander 2007).

The "power distance" dimension affects website content organization, usage of people status in texts, application of official symbolic, application of signs reflecting quality, layout and usage of formal language.

The "individualism versus collectivism" dimension affects amount of provided options in website, saturation of graphical information, adaptation options, saturation of overall information, organization of content, creation of website navigation.

The "masculinity versus femininity" dimension affects formulation of content, aesthetical design, usage of graphics, amount of offered options and organization of task execution.

The "uncertainty avoidance" dimension affects reflection of security elements, formulation of communication and features of trust, saturation of information, design of navigation, usage of tips and complimentary information and usage of graphics.

The "long-term versus short-term orientation" dimension affects usage of metaphors, formulation of content, and design of navigation and usage of graphics.

Performed literature review suggests that data retrieved from Hofstede dimensions applications for website usability studies can be used for further development and improvement of website usability guidelines, as well as development of developers support tools.

4 CONCLUSIONS

Analysis of the impact given by the culture dimensions is an important step for cross-cultural website design. From the published culture dimensions, Hofstede published the important dimensions for cross-cultural website design that are most researched and applied in website development. Analysis of the culture dimensions facilitates the process of gathering culture preferences and identification of evaluation methods for target users.

From data represented in the article, it can be seen that cross-cultural website developers should pay more attention to navigation structure, application of graphical elements and contents of these elements as well as use of proper language

(e.g. direct translation is not enough) are variables in multiple cultures.

From literature analysis it can be seen that Hofstede dimensions for website development overlap as, for example, need for high context cultures and collective cultures have similar demands for website design.

There is a need for cultural advisor tools development as assistants for developers who want to develop product or service websites for different cultures.

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