Challenges of Multicultural Data Collection and Analysis: Experiences From the Health Information System Research

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Abstract: The effect of culture has been popular topic in recent information system research. However, it is not a simple task to either collect or analyze data containing elements of "culture". This paper presents previous literature on how to measure culture, the theoretical background how to build this construct and a short description of empirical study we conducted in a multicultural environment. Our research topic was to examine the usage of health information exchange systems in two different kinds of healthcare sectors (i.e. Finland and USA). Finally we reflect on our experiences both in collecting data as well as in analyzing it through the lenses of cultural differences. Strengths and weaknesses of multicultural data collection are discussed together with opportunities and threats of analyzing data with the purpose of finding cultural elements.

Keywords: multicultural data collection, information systems, health care professionals, interview, focus groups

1. Introduction

Information system (IS) research discipline has already a widely spread tradition of explaining IT-related issues with cultural differences. There recently has been many special issues in IS journals addressing cultural issues (e.g. Aladwani 2003; Davison & Martinsons 2003). However, culture is a challenging variable to research with its divergent definitions and measurements (Leidner & Kayworth 2006) and many challenges have been acknowledged by a number of authors (e.g. Gallivan & Srite 2005; Karahanna, Evaristo & Srite 2005; Myers & Tan 2002; Straub, Loch, Evaristo, Karahanna & Srite 2002). The main criticisms have arisen from the weak conceptualization of culture, which has led to obscurity in the evaluation and comparisons of the results. Moreover, the measures of the culture often are insufficiently described and conceptualizing of culture is lacking theoretical background.

The term *health information exchange* (HIE) is used to describe often electronic exchange of patient-specific information concerning his/her health. The rationale of HIE is to guarantee patient safety specifications in situations where patients are using several service providers e.g. if a patient goes to a local health center for blood pressure medication, his/her specialist in a hospital should be aware of that. HIE has been seen as a way to increase patient safety and reduce costs in the healthcare sector. However, it is challenging to share health related information across organizations. The barriers are many: legal, social, cultural, technological, and economic. Therefore, studying the factors prerequisites for successful HIE can facilitate the path towards safer and more efficient healthcare.

We chose to conduct the empirical data collection in Finland and in US because of the structural differences of healthcare sectors in those countries. In Finland, the healthcare system is universal and everybody is entitled to (basically) free healthcare, whereas, in US the system is more market-driven and financially based on insurances. This paper written in cooperation with Finnish researchers (referred as Finnish scholars) and US researchers (referred as US scholars).

There are many challenges when conducting empirical studies about culture. In this paper we discuss these challenges and illustrate this discussion with examples from a field study in healthcare sector. This field study took place in Finland and US and it was executed as a semi-structured interviews. Besides language and general cultural challenges, healthcare sector with its nation specific characters and legislation was found to be a very challenging environment for a multicultural data collection.Besides challenges in conducting a multicultural empirical study, we discuss the challenges in extracting cultural elements from the data e.g. how to analyze the data through multicultural lenses and finding cultural elements from the data.

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The paper is structured as follows: first we make a literature review on topics combining information system (IS) studies with cultural issues and present our theoretical approach to understanding culture dimensions. Then, we describe the empirical setting of our data collection among the healthcare employees both in Finland and in USA. Finally, we reflect on our experiences and estimate the strengths and weaknesses of our data collection together with a mirroring to the upcoming data analysis. The results of this paper can help fellow researchers when planning and conducting multicultural data collection. Furthermore, some insights of how to analyze and compare results that are based on interviews from different cultural contexts are also presented.

2. Culture and IT research

Culture has recently been a popular topic in IS research: previous literature reviews about culture in IS research by Leidner and Kayworth (2006) found 82 articles that addressed the relationship from culture to IT. The themes covered were classified to: 1) culture and IT development, 2) culture, IT adoption and diffusion, 3) culture, IT use and outcomes, 4) culture, IT management and strategy, 5) ITs influence on culture, and 6) IT culture.

Studies about information systems development articles have the general main idea that the variation across cultures could lead to differing perceptions and approaches in information systems development (Leidner and Kayworth 2006). For instance, national culture has been found to affect the reporting of failing in information system development processes in a way that more individualistic cultures were more predisposed to report bad news than collectivistic cultures (Tan, Smith et al. 2003). The commitment behavior in software development has been found to be affected by culture in a way that low uncertainty avoidance cultures have lower perceptions of risks in the system development process than high uncertainty avoidance cultures (Keil, Tan et al. 2000).

The concept of *national culture* has dominated the IS research literature (Myers and Tan 2002; Leidner and Kayworth 2006). It has been argued that exploring national differences is especially important for the IS research because of the tight connections of globalization and IS (King and Sethi 1999). Since many organizations are doing business beyond the national borders and global activities are often facilitated by IT the topic of national culture has been seen important to understand the effects of cultural differences in a national level (Ives and Jarvenpaa 1991).

However, the notion of national culture has been criticized for being simplifying above all in overlooking and generalizing the attributes of culture (Straub, Loch et al. 2002; Walsham 2002; Karahanna, Evaristo et al. 2005). Especially, the tendency of relying on Hofstede's (1980) previous work on assuming cultural differences according on national borders has been a source of criticism (see Myers and Tan 2002; McCoy, Galletta et al. 2005). Although offering an easy and well-established solution for studies, this approach has several shortcomings. For instance, Myers and Tan (2002) argued that national culture does not reflect the true cultural beliefs present within different nations and, moreover, do not provide the possibility of subcultures. Moreover, Hofstede´s work has been argued not to be valid nowadays since the surveys were made in the 1970s and solely among employees from one large company (IBM) and with a sample consisting mostly of male employees (McCoy, Galletta et al. 2005). A recent study testing Hofstede's cultural dimension found significant differences in the country scores compared to Hofstede's original work (1980) suggesting that these country scores might not be up to date or even working in today's global world (McCoy, Everand et al. 2005). Despite all the debate, Hofstede's work still dominates the culture-related studies in the IS research (McCoy, Galletta et al. 2005) and it has been argued to still have a place in the research field (Ford, Connelly et al. 2003). In addition, the current conceptualizing of culture in IS studies has been criticized for assuming culture to be static and not chancing element (Myers and Tan 2002). IS-culture research culture is often studied from a fragmentary perspective (Gallivan and Srite 2005) neglecting the combinations of national and organizational cultures.

Several solutions have been suggested to overcome these problems in the current conceptualizing of culture in IS research. One solution has been seen to be the use individual level measures of culture (Myers and Tan 2002; Straub, Loch et al. 2002; McCoy, Everand et al. 2005; McCoy, Galletta et al. 2005). Measuring culture at an individual's level would help to avoid too wide generalizations within groups (e.g. nation-states, races etc.). According to Straub et al. (2002, p.19) '*culture must be measured at an individual level even though it is assumed that it is a group level phenomenon'*.. Straub (2002, p.19) argues this is because culture can only manifest itself through the individual and therefore it is not possible to access '*the collective unconscious of the entire culture '* but instead it is

appropriate to use individual unit of analysis when measuring culture. In the domain of healthcare, for instance, age, organization unit, gender and ethnic background were found to have an influence on organization culture perceptions (Helms and Stern 2001), thus suggesting that perceiving culture is an individual process.

Moreover, in order to develop more rigorous ways for measuring culture the use of theory-based measurement has been recommended (Straub, Loch et al. 2002). Previous cultural studies in the IS field have recommended structuration theory (Walsham 2002), value-based approach (Leidner and Kayworth 2006) and Social Identity Theory (Straub, Loch et al. 2002) as a prominent theoretical back ground for cultural studies. In our research, we are using the Social Identity Theory as a background to develop our concept of culture and its measures.

3. Theoretical base for culture

To understand how subjective culture develops within an individual this study uses the Social Identity Theory (SIT) (Tajfel and Turner 1979) as the theoretical background. According to SIT, a person has not only one personal self, but several selves that are corresponding to different group memberships. Changing social contexts trigger an individual to think, feel and behave on the basis of these levels of self. The basic idea of SIT is that social categories (e.g., nationality, sports team) provides a definition of who one is, in other words what is one's social identity. The concept of *social identity* has been defined as '*the individual's knowledge that he belongs to certain social groups together with some emotional and value significance to him of this group membership'* (Tajfel, 1972, p. 292). People have several such category memberships they feel to belong and each of these categories represents a social identity in the individual's mind. These memberships in turn produce *group behavior,* for instance, normative behavior, collective behavior, shared norms, and mutual influence (Hogg and Terry 2000).

The social identity immediates social contexts in a sense that social context triggers social identities into active use. This means that the category that best fits the context becomes salient in that context. For instance, in a working environment the professional identity and the membership in the working group might be dominant and lead to certain behavior (e.g. way of talking) while in a pub the behavior might be affected by the membership of the group of football fans. This is due to structural fit (i.e. situationally relevant similarities among people) or normative fit (i.e. category specifications account for contest specific behaviors.) Identification process is explained in SIT based on an individual's self-enhancement and uncertainty reduction (Hogg and Terry 2000). It is beyond the scope of this study to take a stance on the formation of groups and the socio-psychological origins of SIT. Instead the interest lies on the impacts of such group memberships on how it affects on attitudes and behaviors.
Although SIT has developed within European social psychology it is articulating also with organization and management science (Hogg and Terry 2000). Typically, an individual's ingroup is a membership in a preexisting social group, such as gender and race (Bhattacharya, Rao et al. 1995) or vocation (Mehra, Kilduff et al. 1998) but to a certain extent individuals also derive their identity from the organization or work groups they belong. For many people their professional or organizational identity can be even more pervasive than the identity based, for instance, on gender or nationality (Hogg and Terry 2000).

Originally suggested by Straub, Loch et al. (2002) and later supported by Gallivan and Srite (2005) and Karahanna et al. (2005), SIT has been argued to be a suitable theoretical basis for culture studies in the IS research and it has been previously used in the IS studies to explain IT adoption (Gefen and Ridings 2003). In this study SIT is used as a background theory explaining the mechanism behind the empirical findings. In this thesis SIT is used as a platform from which the conceptualizing of the culture is conducted. In the other words, it is used as a theory for explaining (see Gregor 2006) with the purpose of rather than predicting, explaining primarily how and why some phenomena occur.

Hofstede (1991) suggest that several layers of cultural programming shape one's behavior. These layers consist of national, regional, ethnic, religious, linguistic, gender, generation, social class, and organizational culture. A recent article of Karahanna et al. (2005) elaborated further the layered notion of culture and created a hierarchy of cultural layers (Table 1.) The uppermost (supranational) layer of culture pertains to group of people sharing a region, ethnicity, religion or tongue. The second (national) layer consist or collective properties shared by citizens or countries. The third (professional) layer focuses on the employing organization and industry. The fourth (organizational) layer consists of shared social and normative values in organization. The final (group) layer consists of cultural

differences within a single group at a level less than of the organization. These layers of culture are overlapping and it is suggested that individual's culture is a product of these different levels of culture and, more precisely, their combination. (Karahanna, Evaristo et al. 2005)

Table 1: Levels of culture (Karahanna, Evaristo et al. 2005 p. 5)

Level	Definition
Supranational Regional Ethnic Religious Linguistic	Any cultural differences that cross national boundaries or can be seen to exist in more than one nation. Can consist of: Regional – Pertaining to a group of people living in the same geographic area Ethnic - Pertaining to a group of people sharing common and distinctive characteristics Linguistic – Pertaining to a group of people speaking the same tongue
National	Collective properties that are ascribed to citizens of countries (Hofstede 1984)
Professional	Focus on the distinction between loyalty to the employing organization versus loyalty to the industry (Gouldner 1957)
Organizational	The social and normative glue that holds organizations together (Siehl and Martin 1990)
Group	Cultural differences that are contained within a single group, workgroup, or other collection of individuals at a level less than that of the organization

To illustrate the notion of interaction between the cultural layers, this study builds on the virtual onion metaphor (Figure 1). The virtual onion metaphor was first introduced by Straub et al. (2002) and it is used in this study as a tool to scrutinize individual's identity, which in turn is expected to shape IT behavior and attitudes. Virtual onion notion is based on SIT (Tajfel and Turner 1979) and it suggests that each individual, like onions, consist on different layers. In the metaphor these layers are different cultural identities. These layers are mentioned to be virtual in a sense that they can shift and change over time and circumstances. Drawing from the metaphor of a virtual onion, this study understands *culture* rather than just one dimension of person's identity, various layers of culture (Myers and Tan 2002).

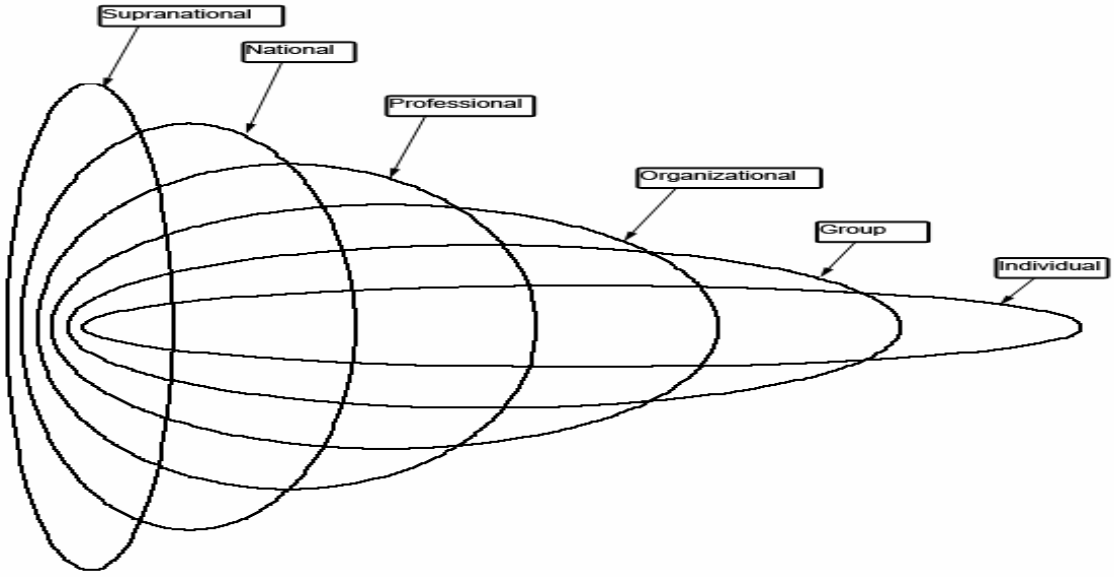

Figure 1: Interrelated layers of culture (Karahanna et al. 1998)

In Figure 1, the layers of culture are hierarchical and interactive. Each individual belongs to a specific national, professional, organizational etc. culture. Some of these layers may be dominant and this dominance may be dependent of different situations. The interaction of the layers derives the individual's subjective culture that eventually influences the individual's behavior. The ellipse *Individual* is not another layer of culture but instead illustrates how this individual culture is a combination of the different layers. It is also assumed that the layers nearest to the core are more important but that these layers can, besides interacting with each other, trade places. (Straub, Loch et

al. 2002) This means that for certain contexts and actions group layer could be dominant while in some other national level.

4. Empirical research

Our research topic was to examine the attitudes and prerequisites of healthcare employees on health information exchange. We wanted first, to collect prerequisites that healthcare professionals thought are necessary for a successful HIE between organizations. Second, we wanted to examine how cultural and structural differences between Finnish and American healthcare sector are affecting the results. We chose to use qualitative approach and exploratory case study since there is still no established theories for studying HIE across cultures.

First, Finnish scholars conducted a data collection in Finland. They interviewed 11 nurses and physicians about the research topics. The interviews were conducted as semi-structured leaving room for extra questions and clarifications. Before the interviews Finnish scholars gave a short presentation about HIE and its development in Finland in order to make the interviewees aware of the topic. The interviews lasted about an hour each and they were recorded and transliterated soon after the interviews.

Then Finnish scholars travelled to USA to Illinois and Indiana to collect data there. In US, US scholars helped with the practical arrangements and also participate to interviews. Most of the interviews in US were conducted as focus group interviews due to the tight schedule of the professionals. Focus groups were chosen for data collection method because of the synergy that could be developed by the interviewees by feeding off one another. Altogether 23 healthcare professionals participated in the focus group interviews consisting of physicians, nurses, managers and IT personnel. Before each interview Finnish scholars presented both the topic of the research (i.e. HIE) and the Finnish healthcare sector. The interviewees were very interested in Finnish universal system so we used approximately 15min to 30min of our interviews for describing the system. These interviews were also recorded and translittered.

For analyzing the data we used a framework of layers of culture combined with conceptual framework for prerequisites of HIE (figure 2).

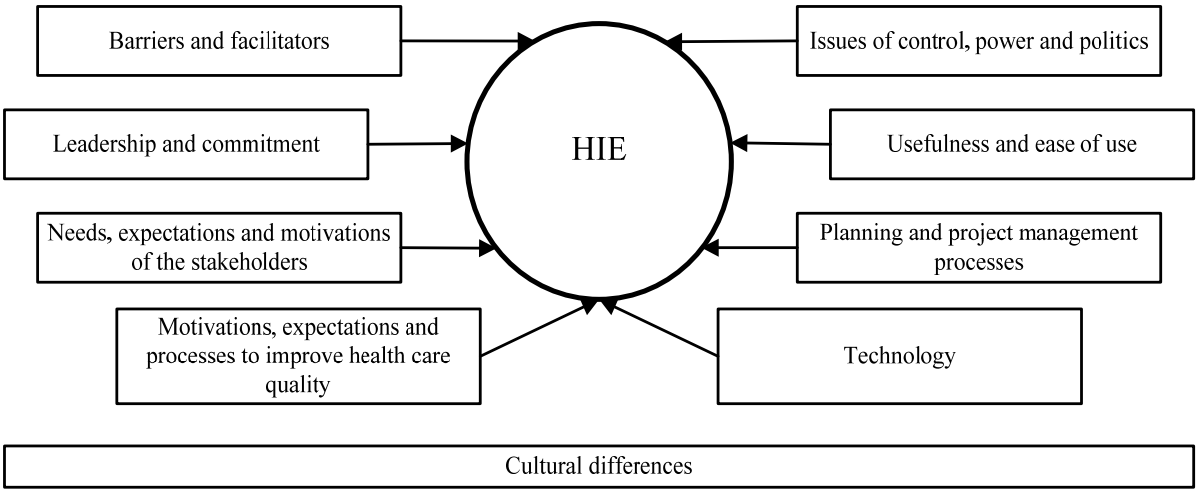

Figure 2: Theoretical framework

We transliterated the interviews. We then were looking for themes in Figure 2 and marked them in the text. We also categorized the respondents according to different group memberships based on interrelated layers of culture in Figure 1.

5. Strengths and weaknesses of the data collection phase and the threats and opportunities of the data analysis phase – experiences from the field

5.1 Data collection – strengths

Obviously, by conducting interviews both in Finland and in US we were able to get deeper understanding of the research topics. By personally interviewing and adjusting our questions

according to person and country it was possible to lead the discussion further. Moreover, we were able to recognize in the transliterating phase the, humor, jokes, sarcasm etc. By visiting several hospitals and watching several demos of healthcare information systems, it became clearer to us, in which kind of environment the everyday work is conducted.

5.2 Data collection – problems

One of the biggest problems encountered in the data collection was the difficulties with the language. Not only the spoken language but the references and meanings we were not familiar with. Finnish scholars found it very useful to have local scholars with them in the interviews to clarify missing points to us.

Finnish scholars also met difficulties in understanding the healthcare specific vocabulary, both in Finland and in US. We needed extra assistance due to the fact that we were lacking the vocabulary. In some cases we felt that it annoyed the interviewees and they felt less confident sharing information with them.

5.3 Data analysis –benefits

Especially beneficial was the presentations Finnish scholars were giving prior to our interviews in US. By trying to explain the unique setting of the Finnish healthcare sector they as researchers realized many points that are bound to Finnish culture. By trying to establish an extensive picture of the Finnish healthcare sector, we had to look at the sector from the perspective of US. That is expected to help us with the analysis of the data, especially the Finnish interviews.

Another benefit is that we did not include questions about the culture as such in our interviews. As culture is very sensitive construct to examine we wanted to extract issues related to culture in a later phase i.e. the analysis. Having a strong theoretical background for our study helped us a lot when analyzing the data. We divided the data according to the themes of individual, group and national level culture according to our own perceptions.

5.4 Data analysis –problems

It is really hard to try to extract the cultural pointers from the data. Although we adopted the framework of SIT, it was difficult to decide which of the answers were supposed to refer to cultural and which ones to structural differences. Moreover, since part of the data is in Finnish and a part of it is in English it is challenging to find common key words for grouping the themes. Since the meaning of the words differs greatly across languages we were not able to create word-based system to analyze the data.

Especially challenging was the fact that Finland and US are very far apart in utilizing information technology in the healthcare sector. In Finland, it is already an everyday tool whereas in US there are many physicians not to mention nurses that are not using IT as widely. This created difficulties when analyzing the results.

6. Discussion

We found all in all multicultural data collection very interesting and rewarding. However, it brings several challenges to research as well. We found it especially useful to have both US and Finnish scholars to work with the interviews. Understanding culture-bound expressions or references can be almost impossible without local help. We also consider giving short presentations about the own research settings useful in order to share a common understanding of the research topic.

Interrelated layers of culture offered a solid background for examining cultural influences on HIE. However, it was more challenging than we expected due to small, of interviews and lack of in-depth knowledge of U.S national culture and healthcare professionals occupational culture both in Finland and in US.

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