

Lessons Learned from Projects in Japan and Korea Relevant for Intercultural HCI Development

Martin Blankl¹, Peter Biersack², and Rüdiger Heimgärtner³

¹ M-Sys GmbH

Isarberg 4, 94522 Wallersdorf, Germany
mb@msys-gmbh.de

² Maschinenfabrik Rheinhausen GmbH

Falkensteinstraße 8, 93059 Regensburg, Germany
p.biersack@reinhausen.com

³ Intercultural User Interface Consulting (IUIIC)

Lindenstraße 9, 93152 Undorf, Germany
ruediger.heimgaertner@iuiic.de

Abstract. This paper describes pitfalls experienced during intercultural human-machine interaction (HMI) development projects in Japan and Korea and how they can be explained from a scientific point of view with the goal of deriving recommendations to avoid them in future intercultural human-computer interaction (HCI) development projects.

Keywords: Cultural differences, culture, communication, understanding, empathy, intercultural communication, intercultural, design, HCI, HMI, intercultural HCI design, intercultural HMI design, lessons learned, Japan, Korea, design/evaluation for cross-cultural users, globalization, localization, management, processes, software, project.

1 Motivation and Objective

Several levels of intercultural know-how contribute to successful intercultural human-computer interaction (HCI) design (cf. [1]). The communication level represents the basis, followed by the levels of project management, software and usability engineering and HCI design itself on the way to successful intercultural HCI design. Hence, on all levels, intercultural communication skills at the basic level can contribute to solve the problems raised on the higher levels by cultural differences. For successful (intercultural) usability engineering, an adequate engineering process is necessary to ensure good usability (i.e. when the user understands the developer's device and is thus able and content to operate it with ease). It is necessary that the developer understands the user ([2], [3]). At least the following aspects of the user must be analyzed in detail before the product can be developed:

- World view, Weltanschauung (metaphysical approach) of the end-user,
- General knowledge (procedural and factual knowledge) of the end-user,

- The context in which the product will be used by the end-user,
- The tasks the end-user intends to accomplish by using the product.

Only by considering these aspects, intercultural communication can be successful, which is as an essential prerequisite for intercultural usability engineering and user interface design, which in turn can therefore lead to successful international product design and user experience. This presupposes the capability to distance oneself from other persons and exploit the chance to recognize the differences to them and then to put oneself in their position. Within the intercultural context this requires being aware of one's own cultural standards before it is possible to compare and recognize differences to other cultures ([4]).

This paper describes pitfalls experienced during projects in Japan and Korea and how they can be explained from a scientific point of view. Finally, the lessons learned are presented to take the wind out of the sails of those detractors challenging the successful accomplishment of future human-machine interaction (HMI) development projects.

2 Projects and Cultural Background

2.1 Experiences during Two Projects

The first project example concerns the development of driver navigation systems for the Asian market, i.e. the experiences come directly from intercultural human-machine interaction (HMI) projects. Car manufacturers are in a global market where they demand a worldwide infotainment solution from one supplier (cf. [5]). However, European navigation systems do not work in countries like Japan or Korea because structure of a street address is completely different (cf. [6]). For example, in Japan, there are seven layers for a street address in opposition to a European one where you can locate any address using the country, town/city, street and house number. In Japan the house numbers are not registered in a row, but sequentially according to their building date. This makes orientation difficult even for natives. Therefore, navigation addresses are often entered by phone number and an algorithm must match the number to the relevant address and retrieves the related data from a huge database. Furthermore, traffic messages are also handled in a different way, which is only available for the members of the particular association. All these differences made the “worldwide” solution of a navigation system become very adventuresome.

The second project example comes from a German company which is active in the area of energy technology in Japan. It's core business is the regulation of power transformers by so-called on-load tap-changers, which adapt the transmission ratio of the primary to secondary windings to changing load ratios and, together with additional, innovative products and services, ensure an interruption-free power supply. The Japanese market is not easy to enter because of different reasons. One of them is cultural hurdles which often aggravate and delay projects. Japan has the image of being a “premium market”. Therefore Japanese customers are prepared to pay for “premium” products, quality and services. In addition, in East Asia, Japan plays the role of a technology leader in the view of many other Asian countries.

Therefore the effort to enter this market is very worthwhile. Once you are accepted in Japan, the business in other Asian countries will also benefit from Japan's image: It is well known in Asia that Japan in general has very high requirements in terms of quality and security. What is accepted in Japan will in many cases also be accepted in other Asian countries (cf. [7]).

2.2 Cultural Background

Standards

While in 192 countries in the world the IEC (International Electro Technical Commission) standard is accepted, the Japanese insist on having their own JEC (Japanese Electrical Committee) standard for testing and approving products in the energy industry (cf. [8]). Even though the German manufacturer's in-house rules for product validation are much tougher than the requirements of IEC or JEC, and even though the Japanese are also members in the IEC, the tests must be done and accurately documented exactly according to what the JEC standard says.

Trust

To build trust is essential in Japan in order to improve business performance (cf. [9] and [10]). For this purpose you need many meetings to present and explain quality assurance and supplier evaluation systems. Also a deep understanding of the product is requested by the Japanese OEMs and end-users. Sometimes their curiosity comes close to compromising corporate secrets. Visits in the German manufacturer's work shop are serious for Japanese delegations. They are also very helpful for building trust. "To see is to believe", as one of the Japanese visitors used to say.

Quality View

Approval tests, witnessed by end-users, are required to document the quality and to prove that the specifications are fulfilled. This is also an important requirement of the end-users in the Japanese energy business. Although a complete type test according to the JEC standard cannot be witnessed, to see parts of such a test, to be eye witness and to see the results of that partial test is decisive.

3 Identified Intercultural Challenges during the Projects

The projects confronted not only technical challenges, but also collaboration challenges. The easiest headache to solve was with the display language and could be solved by technical translators. But this could not solve the intricacies of communication. Therefore, sensitiveness is required.

3.1 Formalized Communication in Japan

The technical project leader from Germany got into deep technical discussions with a senior expert from the Japanese company. Since the Japanese expert was several years

older, the acceptance of the young German project leader's position was rejected. Obvious problems could not be discussed directly, but the traditional formal path of data exchange had to be followed.

3.2 Interactive Learning in Japan

The Japanese Partner Company had to be taught the new technologies. During the lessons the teacher asked several times, if everything were understood. All these questions had been answered with "Yes". After dedicated inquiries it came out that the lessons were not understood. The German teacher changed his strategy and let the participants make exercises at the desk. But this was not accepted by all participants. About 20 % felt blamed and did not accept the exercises. They simply "disappeared" the next day. The remaining participants appreciated it more and more and had fun with the lessons.

3.3 Concept of Quality in Korea

The Korean supplier had another concept of quality. A reset (boot procedure triggered by watchdog) or misbehavior (functional errors) was not a big problem. But for a German car manufacturer, this could not be tolerated. This concept had to be transferred to the Korean supplier.

3.4 Dynamic Korea

The Korean supplier had a very pragmatic working style. When hardware parameters did not match the expectations, they changed components on short notice – also without considering EMC aspects. After intense examination, the changes have been accepted.

3.5 Font Problem in Japan

Since the Asian branches were not considered from the very beginning, several subsequent adaptations were necessary. A big problem was the font, since the specialist for the primary unit was no longer available. Therefore, all the font determinations had to be re-investigated. Afterwards, unplanned effort became necessary for checking the text length and adaption of the layout.

3.6 Asian Look and Feel vs. German Objectiveness

For German understanding, Asian navigation systems have too many unnecessary features. For example, the "carsor" (symbol of one's own car on the map) in Germany is only an arrow. In Asia, you can choose between dozens of different car bitmaps. Therefore, the German car manufacturer demanded an adaptation of the user interface to the conservative German style.

3.7 Higher Efforts and Investment for Testing Specific to Japan

Performing the type test for on-load tap-changers according to JEC is an “absolute necessity”, even though the technical requirements for this test are far below the German manufacturer’s in-house requirements for testing. And to perform the test it is not enough to understand the document issued by the JEC just linguistically. The intricacies in semantics and the relevance for action can only be uncovered with the help of Japanese supporters, coming from this business and knowing the technology in detail.

To plan and to perform the tests requires great efforts and appreciable investments. Many people were involved and the resources in the manufacturer’s test centre were blocked for months by occupying engineers as well as test stands and test and measurement equipment as the JEC tests need painstaking preparation by engineers and the pure testing time for completing all the required mechanical and electrical tests summed up easily to half a year.

3.8 Isolation of Manufacturer from End-Customer

In many countries worldwide it is quite normal that the service and maintenance of tap-changers is done by the manufacturer. This has the advantage that the experience of thousands of service jobs is bundled and the end-customer profits from this experience. In Japan the transformer maker feels responsible for the complete transformer, including the tap-changer which is supplied from Germany. He is the only one who does the maintenance, for the transformer and for the tap-changer as well, and this is what the end-user actually expects.

What for the Japanese is a traditional way of customer relationship appears as being held off from the end-customer for the German manufacturer. It may not be done intentionally, but in fact and as a result it is protecting the market from Foreign Service providers.

4 Possible Explanations Drawn from Culture Studies and Derived Lessons Learned for Intercultural Projects

Ad 3.1: Japanese culture is well defined and organized. Honor is strongly respected. Everything has to follow a certain rule. Lessons Learned: Accept the cultural characteristics of the cooperation partners and try to follow their rules.

Ad 3.2: The Japanese school system is basically *ex cathedra* teaching. Therefore, interactive learning is not trained. Lessons Learned: Accept the cultural characteristics of the cooperation partners and try to follow their rules. Furthermore, also take dependent thinking into account because of the resultant high uncertainty avoidance (cf. [11]).

Ad 3.3 and 3.4: For the Korean, time to market is the most important aspect in order to be the first with highest market share. Therefore, they do accept minor errors

in the product, when overall improvement results and the product find customers. Besides, also the customers are more tolerant of failures. Lessons Learned: In the case of insisting on one's own guidelines explain carefully why you are insisting on them.

Ad 3.5: Under project pressure, documentation and knowledge management is always neglected. Lessons Learned: Plan a buffer for completing the work.

Ad 3.6: This is a mentality difference. Lessons Learned: Also consider seemingly minor aspects in the project planning.

Ad 3.7 and 3.8: There is a consensus between all of the 10 Japanese Electrical Power Companies and the ca. 14 Japanese transformer manufacturers about how to approve the quality of tap-changers and it deviates from the rest of the world. The Japanese market thereby has been protected for decades. A kind of "comfortable" win-win-situation for both sides has existed for a long time: for the transformer manufacturers, who could charge relatively high prices, but also for the end-users, the power companies. They undoubtedly got good service and could retrieve the high costs for it from their customers. This refinancing was supported by the very special Japanese system in the energy market. It allows the energy companies to charge all costs to their customers, plus a defined margin (cf. [12]). These structures seem to be softening. A forceful change of mind is evident, especially after the Fukushima disaster with its enormous costs for repairing or replacing damaged transformers and for compensation payments to the victims, as well as for gigantic energy imports while nuclear power plants are down. The government, holding high shares in energy companies, advised them to open the tenders and to also consider foreign, economically priced suppliers, as long as the quality meets the requirements.

Lessons Learned: There are basic requirements to fulfill. If a supplier does not accept that or wants to discuss the sense or nonsense of Japanese rules, he will not be successful. The specifications must be fulfilled and the tests must be performed. Not always because they make sense, but because they are written in the specification and the specification is the "bible", the common understanding of all involved (Japanese) parties. Market entry in Japan is longsome. It requires patience, strain and may not to be shy of investment. The yield of these efforts is loyal partners, many small feelings of success and many new adorable friends for the involved members of the German project teams.

In addition, it is essential to establish relations, not only to the OEM, but also to the end-users. It is not easy to bring decision makers to the German factory, but once they are there, they might be convinced that even non-Japanese companies have high quality standards, high manufacturing and assembling skills, highly skilled staff. Once the end-user is convinced he will ask his Japanese supplier to make the German product available for him. And there is one thing that can help and open the door: German culture and traditions, as well as German and especially Bavarian food and beer are very popular among the Japanese. And therefore Japanese people at least like to see Germany. German companies can use this affinity for inviting decision makers.

5 Recommendations for Intercultural HCI Development

5.1 Pay Attention to the Implications of Cultural Differences in the HCI Design Process

Analyze the cultural characteristics of the desired target groups and take them into account in intercultural HCI development. Take into account cultural differences in thinking from developers, manufacturers, producers, designers, users and customers. Plan enough buffer time to manage the additional effort caused by integrating teams from different cultures. Determine very exactly the user and customer requirements and accept them. Get into contact and establish good relationships before starting with the project. Ensure that you are familiar with the characteristics of the desired cultures and establish empathic communication.

5.2 Consider the Additional Effort for Adapting Technologies to Different Cultures

The integrated system must be adapted to the look and feel of the car manufacturer and the system's environment (e.g. a "head unit", which steers several sub devices) must be adapted to the Asian requirements. The information provided by the sub devices should be displayed by the "framing" head unit on the same touch screen display. Furthermore, a remote control should be used to operate the integrated box. The final solution is a "hybridized" infotainment system. The navigation and communication part can be provided by a local supplier integrated as separate hardware within the standard infotainment system. The entertainment part, the car interfaces and the touch screen for the user interface can be delivered by the "worldwide" Tier-1 supplier.

6 Conclusions

International projects are challenging. But in total, it is great fun and the experience lets a person grow mentally. When respecting each other, success is possible. And international friendships arise. From the analysis of the lessons learned during intercultural projects in Japan and Korea useful recommendations for the intercultural HCI development process as well as for the adaptation of technologies to the relevant cultures can be drawn. Nevertheless, this paper just touches on a tiny part of the problem and with it only a few aspects on its surface. Therefore, future research is necessary to study the issues in detail and to integrate them into the overall intercultural HCI development process.

References

1. Heimgärtner, R., Tiede, L.-W., Windl, H.: Empathy as Key Factor for Successful Intercultural HCI Design. In: Marcus, A. (ed.) HCII 2011 and DUXU 2011, Part II. LNCS, vol. 6770, pp. 557–566. Springer, Heidelberg (2011)

2. Honold, P.: Culture and Context: An Empirical Study for the Development of a Framework for the Elicitation of Cultural Influence in Product Usage. *International Journal of Human-Computer Interaction* 12, 327–345 (2000)
3. Nielsen, J.: Usability engineering. Kaufmann, Amsterdam (2006)
4. Thomas, A., Kinast, E.-U., Schroll-Machl, S.: Handbook of intercultural communication and cooperation. Basics and areas of application. Vandenhoeck & Ruprecht, Göttingen (2010)
5. Heimgärtner, R.: Research in Progress: Towards Cross-Cultural Adaptive Human-Machine-Interaction in Automotive Navigation Systems. In: Day, D., del Galdo, E.M. (eds.) *Proceedings of the Seventh International Workshop on Internationalisation of Products and Systems (IWIPS 2005)*, pp. 97–111. Grafisch Centrum Amsterdam, The Netherlands (2005b)
6. Dr. International: Developing International Software (2003)
7. Lippert, S.S., Marcus: Premiummarkt Japan? Preisstrategie und Profitabilität deutscher Unternehmen in Japan. Nexxus Communications K.K. (2008)
8. Japanese Electrotechnical Committee (JEC),
<http://www.spsp.gov.cn/DataCenter/Standard/PDFView.aspx?ca=AeFU7jn6zeY=> (last access March 03, 2013)
9. Matsumoto, D., Hwang, H., Yamada, H.: Cultural Differences in the Relative Contributions of Face and Context to Judgments of Emotions. *Journal of Cross-Cultural Psychology* 43, 198–218 (2012)
10. Sako, M.: Does Trust Improve Business Performance? In: Kramer, R.M. (ed.) *Organizational Trust: A Reader*, pp. 88–117. Oxford University Press (1998)
11. Hofstede, G.H., Hofstede, G.J., Minkov, M.: *Cultures and organizations: software of the mind*. McGraw-Hill, Maidenhead (2010)
12. Onishi, N.F., Martin: A frustrated push to break grip of Japanese utilities. *International Herald Tribune* (2011)