Open Source Mobile Development, Enabling Contextual User Centered Development Model

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Abstract

As the use of mobile data services has spread across the globe, the effect of cultural differences on user requirements has become an important issue. This paper proposes an approach for mobile data services that takes cross-cultural differences into account. To determine these attributes, a qualitative method is devised (in-depth interviews) in Indonesia are conducted. Indonesia has about 222 million population and more than 6 million of its population use mobile devices. This is potential market for services provider, though they still have to analyze the behavior of people in Indonesia as well as cultural background and user acceptance.

The shift from system oriented to human context oriented design causes system development process is not only dictated by developers. Culturability, the merging of culture and usability, has implications for system design. Usability must be redefined in terms of a cultural context, as what is user friendly for one culture can be vastly different for another culture.

However, customization to satisfy the culturability consideration sometimes may not be established due to the license limitation. Openness and flexibility is are key factors for Open Source Software to provide solution for specific local problems. By employing FOSS the special development and customization based on the culturability and user context is possible to be achieved.

1 Introduction

Internet has been contributing big impact to the world and has fundamentally changed many aspects of our life. The number of computer hosts and the number of people connected to the Internet has been rising since the beginning of the Internet. The digitization of information is wealth-creating activity that drives the economy and global trade. Work is structured around the networked computer. Although the Internet has helped to break down barriers of space, distance, and place, but we are still constrained in many ways by our physical limits of existence. The Internet has not diffused randomly but has spread in definite patterns, heavily constrained by the economic, socio-cultural, and political structures.

The quality of the connectivity in underdeveloped and developing countries is far poorer than in the developed North. The more developed regions of the world (measured by GDP or average income per citizen) command most of the Internet hosts; the greater the proportion of its citizens who own computers and have Internet access. Users in developing countries are unable to put onto the Internet content that can compete on an equal footing with the overwhelming content placed on the Internet by the developed countries of the West and North.

Therefore, to provide the Internet services in the developing country such as Indonesia, the cost efficient approach should be the main consideration. The same technology or the same model of interactivity cannot be used. User centered approach by focusing on cultural consideration should be more employed rather than only technological considerations.

According to LIRNEasia researcher, Divakar Geoswami, Information and Communication Technology sector (ICT) in Indonesia is one of the most dynamic sectors of the economy contributing most to GDP growth rate (around 16%) than any other sector [1]. The ICT sector in Indonesia is dynamic, growing and profitable. Compared to the past, the regulatory environment is more transparent, pro-market, pro-growth and therefore pro-poor.

The mobile sector that has added 6.6 million subscribers during the first half of the year 2005 and where operators
have aggressively invested in infrastructure. For the year 2006, we may see an investment of more than $2.5 billion dollars made in the mobile infrastructure as the existing operators gear up to face the challenge from Hutch and Maxis who are rapidly rolling out their infrastructure. The mobile operators have been expanding their network at a frantic pace: Since the end of 2005, Telkomsel has increased its number of base stations from 7,741 to 12,156 a growth of 57 percent; Excelcomindo’s base stations during that same period have grown from 3,620 to 6,052, a growth of 67 percent. Despite making substantial investments, mobile companies continue to be profitable. Excelcom and Bakrie Telecom that had losses in 2005 have made profits this year.

The number of mobile phones in Indonesia per 100 inhabitants has increased quite significantly from 21.6 in the end of 2005 to 24.32 in the middle of this year. The number will probably go up by the end of the year, although growth from 2005 to 2006 may not be as rapid as from 2004 to 2005. However, with the introduction of new services in mobile sector, there will be more rapid growth in the number of mobile subscribers. More competition in the mobile sector will lower mobile retail prices that are quite high compared to the region and make it more affordable to those on the “bottom of the pyramid.”

2 Why mobile services?

The growth of mobile phones users also depends on the use-case applications provided by mobile services provider. The latest user feature offered is the video call between mobile users, using the 3G technology. The 3G technology also being used for data transfer and mobile Internet access. Other feature which are also used is the SMS Banking, which provided by the mobile services provider in cooperation with local banks. Compare to another country for example Germany, this feature is not provided by the mobile services provider. This explains that the user’s response differs base on several aspect, which trust, privacy and reliability. Another example are the usage of mobile technology using Code Division Multiple Access, which implemented in Indonesia with CDMA2000 technology. The implementation leads to sufficient Average Revenue Per User (ARPU) where the service provider could charge for low communication cost from the user. This technology also supported by the behavior of the user in Indonesia which likely to have long conversation rather efficiently. This kind of behavior cannot be found in Germany, which also explains that CDMA2000 technology are not implemented there. Therefore, it is important to analyze the culturability to design mobile service implementation.

This works aims to identify and studies design standards and conventions that distinguish cultures as manifest in existing mobile services; and second, to understand how cultural influences lead to variations in people behaviors and practices. The people behaviors lead into different security, privacy aspects based on their environments or locations. Once this is understood, the development of what we term “culturability” guidelines may be implemented when considering design for mobile services. Beside the culturability consideration, the user acceptance included in order to design the mobile services. Specifically, we focus first on identifying cultural design cultural markers present in mobile services that have different languages, originate in different countries, and represent different genres. Based on already identified cultural design, we should identify the user acceptance of the related mobile services.

Mobile devices has a chance to play a bigger role in developing countries such as Indonesia. For many people in Indonesia, mobile device is their first computer. They use their handphone to access Internet, send SMS, doing business transaction etc. The mobile device users are more heterogeneous than desktop users. Many users who are still afraid to use the desktop computer, but they already used their cellphone application without. Many users who does not have high education background already used SMS for doing the banking transaction, etc. As shown in Fig. 1, users of mobile devices are heterogeneous, it encourages the invention of used of the mobile services, the normal people on the street who sells his food exploiting his cellphone to accept the order, or to contact his partners. It opens a new ways of doing transaction cheaply, especially in situation like Jakarta, where the traffic jams are everywhere.

Moreover, most of users do not want to open the manual or to learn the system. They just want to use it right away. In this situation, creating the development for mobile devices, is more challenging and difficult. The development of mobile application requires different development strategy. Understanding the context of use as well as the cultural background is the key of success. Mobile applications should compatible with the usage context as well as the cultural background of users. For example in the Fig 1a. Other cases is shown in Fig 1b, the ages of mobile users can be very young or very old. For the users who cannot read, there should be other approach in designing, how the device should be operated. Thus, mobile application should be very simple, but very reliable, as well as secure and efficient in bandwidth consumption. Secure in the sense of the complexity should be hidden from the users.

Therefore, in designing the mobile application, the role of users plays more important roles. Usability evaluation should be more developed in order to suit with the user, i.e. their cultural background. For example a questionnaire or think aloud techniques for particular group of users in certain cultural background cannot be employed, because it cannot produce a representative result of user responses. Microsoft in India has employed a method called Boillary-
wood method for developing a mobile application which will be used by users who cannot read. However, even though there is available development method, an available mobile development platform that can be used and customized freely is also a must. Otherwise, to do customization or writing from scratch is very time consuming and highly cost for developing country such as Indonesia.

3 From machine to context oriented system design

The shift from system oriented to human context oriented design causes new considerations in choosing the appropriate system. A machine oriented design is mostly a deterministic system based on automated data processing. System is designed with deterministic behaviour and definite boundary. Role of user is only described as behaviour at the human-computer interface and ignored otherwise. Mismatches between technology and user preferences usually is interpreted as the failure of users to understand or learn a well-working technology [2]. Applying human context approach, system development process is not only dictated by developers. Users play more active and important role. User acceptance plays more important role in evaluating the quality of system. Furthermore, user preferences are determined by the culture and the local context. Software must fit with this cultural and local context, without considering the cultural aspects some software products fail to satisfy the users [3]. Cultural aspect plays important role as critical success factor for implementation of ICT [4]. Culturability, the merging of culture and usability, has implications for system design. Usability must be redefined in terms of a cultural context, as what is user friendly for one culture can be vastly different for another culture. Many of the icons, metaphors, shapes, colors of text and background, frame/text locations on screen, etc. employed in systems design are relevant to the culture of origin of the software.

However, most User Centered Design (UDC) approaches are still focusing on how human interacts with computers, rather than looking the other way around, how the technology can be shaped to support enrichment of human skill and socially useful product. The cultural model deals with the issue how strategies, attitudes, habits and norm are influencing the use of artifact. Human context approach means accepting that any social entity has its own history.

As culture becomes critical issues, designers have begun to realize the role of culture in design and to develop the method and process of applying cultural factors on design. However, the customization of software sometimes may not be performed due to the license limitations, especially for proprietary software. The Open Source license, enables the customization, can be performed freely without a complicated legal process. Developers in developing countries may develop a specific customization to fulfill the local needs without asking the permission of a company. Therefore, FOSS enables the possibility to customize, redesign or re-implement system according to culturability, as well as for doing research in culturability in developing countries. Without open source, major methods of cultural design were limited only in pencil and paper survey that requires significant time, effort, and cost. With FOSS researchers can choose a mature programs and redesign it according to culturability particular users.

Localization (providing user interface to other languages) is a basic effort in accommodating users who has different culture than the original developer. However, only translating the GUI into the user language sometimes is not enough. Understanding the user context is an important aspect in customizing or designing a system. As shown in Fig. 2, an icon or menu for "Address book" cannot be translated easily into Indonesian as "Buku alamat". For particular users they do not know the real object such as Address Book, because they never see, experience or have and use that real object.

Language is used to describe and report the reality. However, language is not only content but also provide a context and way to re-contextualize content [5]. Therefore, only translating into their language without considering context does not solve the metaphor problem. We have to redesign the user interface to bring the concept of real object such as Address Book to an understandable object. Some user preferences for software also influence by the culture, the Open Source enable the local developers to perform more
than translating the menu to accommodate this culture preference.

4 Culturability and user context

Usability concerns are different in each culture. Culture is often restrictively identified with the behaviour, ritual, song, ceremonies or other cultural products of individual societies. It is also shared presupposition about the world. In this work we used culture definition coined by Hofstede [6], cultures is the collective programming of the mind, which distinguishes the members of one human group from another. In this definition culture is known as knowledge, acquired through membership of a particular community. Examples: colour, icons, etc. Therefore, culture can be defined as specific group of people sharing a distinctive set of values, symbols, rituals, heroes, etc. to different degrees the result of their interaction with other cultures. Culture can be categorized in different level:

- National levels according to one country
- Regional and/or ethnic and/or religious and/or linguistic level
- Social class level, associated with educational opportunities and with a person profession
- Organization or corporate level according to which the employees have been accustomed by their work organization

Hofstede introduced a culturability index:

- Power-distance (PDI)
- Collectivism vs individualism (IDV)
- Feminity vs masculinity (MAS)
- Uncertainty avoidance (UAI)
- Long- vs short-term orientation (LT)

As shown by Hofstede in Fig. 3, the culturability index of Indonesia can be highlighted as follow:

- Indonesia has Power Distance (PDI) as its highest ranking Hofstede Dimension at 78. The high Power Distance (PDI) is indicative of a high level of inequality of power and wealth within the society. This condition is not necessarily forced upon the population, but rather accepted by the society as part of their cultural heritage. The average Power Distance for the greater Asian countries is 71.

- The second highest Hofstede ranking is Uncertainty Avoidance (UAI) at 48, compared to the greater Asian average of 58 and a world average of 64. This reflects a more moderated influence of this Dimension within the Indonesian society. Generally, a high Uncertainty Avoidance (UAI) indicates the society’s low level of tolerance for uncertainty. In an effort to minimize or reduce this level of uncertainty, strict rules, laws, policies, and regulations are adopted and implemented. The ultimate goal of this population is to control everything in order to eliminate or avoid the unexpected. As a result of this high Uncertainty Avoidance characteristic, the society does not readily accept change and is very risk adverse.

- Indonesia has one of the lowest world rankings for Individualism with a 14, compared to the greater Asian rank of 23, and world rank of 43. The score on this Dimension indicates the Indonesian society is Collectivist as compared to Individualist. This is manifest in a close long-term commitment to the member ‘group’, is that a family, extended family, or extended relationships. Loyalty in a collectivist culture is paramount, and over-rides most other societal rules and regulations. The society fosters strong relationships where everyone takes responsibility for fellow members of their group

- The combination of these two high scores (UAI) and (PDI) create societies that are highly rule-oriented with laws, rules, regulations, and controls in order to reduce the amount of uncertainty, while inequalities of power and wealth have been allowed to grow within the society. These cultures are more likely to follow a caste system that does not allow significant upward mobility of its citizens.

- When these two Dimensions are combined, it creates a situation where leaders have virtually ultimate power and authority, and the rules, laws and regulations developed by those in power, reinforce their own leader-

![Figure 3: Culturability index of Indonesia](image-url)
ship and control. It is not unusual for new leadership to arise from armed insurrection – the ultimate power, rather than from diplomatic or democratic change.

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The culturability index can be used to consider following aspects of mobile application:

- Emphasis on the social/moral order and its symbol
- Focus on expertise, authority, experts, certification, official stamp or logos
- Motivation based on personal achievement.
- Rhetorical style
- Navigation oriented to exploration and control
- Graphics, sound, animation

However, Indonesia is very difficult to view as one culture. There is situation where a particular provinces require a particular treatment. As shown in Fig. 4, the mobile operator has to design the homepage or the picture for marketing in Aceh. Since the picture that has been chosen for Indonesia is not accepted in Aceh due to the local culture consideration. Therefore, flexibility the mobile platform is a key success in Indonesia. The application should be easily customized or changed according to the local culture.

“ The Culturability Inspection Method grew from discussions about usability and how such a concept might change given different cultural backgrounds and users.” [7]. In order to identified the influences at cultural background, we used the term “cultural marker” as indicator. Cultural markers, or indications of belief systems, institutions, religion, customs, habits, preferences, biases and the like, are embedded in mobile services, both deliberately and subconsciously (i.e., the mobile service is not necessarily cognizant of the user cultural phenomenon playing a role in how the designs of the service).

To study user acceptance of mobile services, a framework is needed to analyze and synthesize the individual findings on factors that affect user acceptance. This framework can then be used to communicate key user acceptance factors and their implications for the design of future services. The focus thus differs from the focus of Technology.
Acceptance Model (TAM), which takes the information system to be studied as a given fact and focuses on explaining the underlying forces affecting user acceptance. These underlying forces are mainly related to user characteristics and the social and organizational environment. The Innovation Diffusion Theory (IDT) that has been used in studying user acceptance of consumer products is also focused on the dissemination of ready-made products, and thus it also concentrates in user characteristics and the social environment rather than product characteristics. TAM and IDT will be used and adapted to predict potential user acceptance, but as such they do not provide assistance in the design and development of systems that would be accepted by the users.

Mobile services targeted at consumers have several specific characteristics that may mean that their user acceptance cannot be studied using the same models as with information systems in the workplace[8]. When dealing with consumer services, individuals make voluntary adoption decisions and thus the acceptance includes assessing the benefits provided compared with either competing solutions or the non-acquisition of the service in question. In a marketing situation mobile services have to compete not only with other mobile services but also with alternative solutions in other media. However, focusing too early on only limited user groups may miss possible early adopters.

5 Localization as the first step

The Indonesia language is a normative form of the Malay language, an Austronesian (or Malayo-Polynesian) language which has been used as the lingua franca in the Indonesian archipelago for centuries and was elevated to the status as an official language of the Republic of Indonesia by the Indonesian Declaration of Independence in 1945, drawing inspiration from the Sumpah Pemuda (Youth’s Oath) event in 1928. Indonesia language is used by approximately 200 million people. It is used by some people in East Timor, Netherlands, Philippine, Brunei Darussalam, Singapore, Southern Thailand, Saudi Arabia, Malaysia and Suriname.

Basically, the Indonesian language is relatively simple because there are no case of gender or definite article, no conjugation, no future or past tense, and no even a verb "to be". On the other hand, this simplicity could also bring complexity to speaker because lack of strict rules make difficult to write Indonesia text correctly. Furthermore, the Indonesian language is very contextual which means that the preference of words shall be accustomed with the purpose of articles as well as the audience. Over the years, the Indonesian vocabularies are also influenced and expanded by several languages such as Dutch, Portuguese, Hindi or Sanskrit, Arabic, English and Javanese, and other local languages in Indonesia, mostly through trade contacts and international media. The use of computer also influences the adoption of many English computer terminologies into Indonesian languages.

The localization effort in Indonesia firstly was performed by Prof Dr. Dali. S. Naga, in 1984. This project translated the BASIC command into Indonesia, and it was known as KILANG[9]. However, this project did not take the usability into their translation consideration. In 1996 GNU/Linux was getting more attention in Indonesia. more people want to try and to install this operating system, as an alternative operating system. One of the biggest obstacles of GNU/Linux adoption in Indonesia is language. Most Linux documentations or user interfaces are not not written in Indonesia. There were many Indonesian developers who are working in translating the Linux HOW-TO document and the other related document to Indonesia language. Since most users in Indonesia start to install and use software directly without reading any documentation, the translation of the installation and administration of the Linux Distribution will provide a big assistance for the new users. In 1997 a group of lecturers and students in Gunadarma University was formed to translate the SuSE Linux distribution. SuSE 5.3 was chosen because is the most complete distribution and has complete documentations. It was the first Linux distro which available in Indonesian Language for the menus and on-line help.

Nowadays, some software vendors have tried to provide the menu also in Indonesia language. The vendor such as Nokia, Ericsson have already provided the menu in Indonesian language in their products. However, the Indonesian version of the menus sometimes are awkward or confusing, such as shown in Fig 5. In this example, the translation has many problems such as, the used of original English terminologies, which are for many normal users are still hard to understand (Konaktivitas, Sinkron), and the abbreviation which has been not known for the normal users (i.e. Mjr: p’ankt). However, this problems always appear in the localization process in Indonesian.

There is an on-going effort performed by Pasat Pengembangan Bahasa Indonesia, to translate the scientific and engineering terminologies into Indonesia terminologies.
However, it was found that many translated words are not popular for the users. If the correct terminologies are used, users will get confused and will not be able or more difficult to understand the sentence.

The type of users determine the strategy of the terminology selection, as well as the narration style of the sentences. Furthermore, it will determines how we the translated terminology will be chosen from the original terminology. For the users who have been familiar with the English, adapted terminologies such as: diskette, konfigurasi (configuration), boot, etc are more suitable. The used terminologies also provide a smooth transition from their background knowledge.

For example, translating "window" to "jendela" is not a good idea. Users will understand faster and easier with "window" rather than "jendela". However, it is it is not the correct way in translating a terminology into Indonesia language, but it is better from the usability point of view. In translating the menus the usability play more important role than the correctness of the translation from linguistic point of view. Many translated books in Indonesia are useless due to the "awkwardness" of the translation. Authors tend to use the "new" terminology which are correct from the Indonesia grammatical point of view, but are very "strange" for normal users.

For example: *Mouse is a device which requires a device driver.* Many authors try to translate this English sentence into Indonesian: *Tetikus suatu perangkat yang membutuhkan sebuah penggerak perangkat*. Most users do not understand the translated version. Because they are more familiar with "mouse" and "device driver" rather than "tetikus" and "penggerak perangkat". They tend to read the English version again, because it is easier to understand.

It is important for the translators to keep balance between the familiarity of a terminology and the correctness of a terminology from the linguistics point of view. To tackle this problem sometimes a new term is used but with a more familiar term in the bracket. For example: *mount, load.* These words are translated as: *mengaitkan (mount), memuatkan (load).* However, it can be used only for the online help, not for the menus.

In doing the localization of program into Indonesian language there are some problems which have been taken into account:

- The original terminologies are still used and not being translated. In some cases, the English terminologies are widely used by Indonesian user, for example, *modem, mouse* etc.

- The original terminologies are adapted. Some English terminologies are adapted directly, only how they are written is different. It appears in the case of *device (divais).*

- The terminologies are translated. Some terminologies are possible to be translated into Indonesian language. Furthermore the translated terminologies are popular enough to the user. For example *berkas (file).*

- Introducing a new terminologies.

- Some terminologies which cannot be translated, such as *default.*

6 Lesseon learned from distro development

A development a mobile application, is quite similar with the development of a ready to use software package such as Linux distribution (distro). Distro (distribution) is a collection of kernel, libraries, application and utilities that make the installation and uses of Linux easier for the normal users. Distro plays important role in introducing Open Source widely, because it makes users can easier to install and used the new system.

Customizing distro or remastering distro usually is performed due to the specific requirements of the users, such as the localizations of menu and installation process. According to Computer Literacy Survey in 2001 from Agency for Assessment and application of Technology (BPPT), Indonesia users still needs the GUI which is written in Indonesia language. Other programs such as dialer for the local Internet Service Provider also a local specific requirement. Since the Internet connection in Indonesia has not been in high capacity, Linux distribution also plays role as knowledge delivery media. Thus the availability the system in one media (CD-DVD) is very useful for users. Thus distro in Indonesia has to include the documentation in Indonesian. The first distro which was developed in Indonesia was Trustix Merdeka [10]. This distro was developed by Indonesian developer who is working with Trustix, a Linux company in Norway.

Translation for a complete distro is more complex than translating a program, because some works should be translated such as:

- **Graphical User interface components**, such as menu, but tons, title of windows. Some terminologies should be translated consistently This problems is shown in Fig. 6

- **Warning message**, such as error and warning messages should be translated according to context otherwise user cannot understand it.

- **Online help text**. The terminologies in this text should be consistent with the translated item in the GUI components. It also has different file formats.
Figure 6: Consistency between GUI components

- **Documentation.** The manual books, or tutorial books have to be consistent with the program and translated GUI components. It has also different file formats.

In performing translation some consideration should be taken into account, such as:

- **Usable translation.** The translation is not only correct according to grammar and guidance for Indonesia language. It is better to avoid the use of a new terminology which is very "awkward" for typical users.

- **Consistent translation.** The files that should be translated are spread in hundreds of files. For example, "File" or "Find" should be translated into the same word for all files or program components. It should be avoided the use of different translated terminologies for a same word.

- **Consistency between the menu in the program, online help and manual as well as consistency among programs in the distro.** As shown in Fig. 6, some explanations in online help refer to a GUI component. For example "Push the Cancel button", should be translated to "Tekan tombol Batalkan". Some GUI components in a programs also refers to other GUI components in other programs. In a distro there are more than 100 programs and about 1000 files.

- **Size of translated text with the GUI components.** In many cases, the translated text in Indonesia are longer than the English version. Therefore sometimes the program itself should be change. For example "Help" will be translated as "Bantuan" or "Keterangan bantu". Calculating the lengh of text can be avoid this problem. Availability the source code of program is a big help.

Figure 7: Consistency problem between different softwares

- **The accelerator keys.** For example in the English version "New" has accelerator key Ctrl-N, the Indonesian version is "Baru". However if we keep the accelerator key as Ctrl-N (there is no relation with "Baru", then we have to change into Ctrl+B). Furthermore, it should be checked whether there is a clash of accelerator key.

7 Why localization in OSS is faster

In early 20th century the tension between creative practices, and intellectual property laws and policies governing access to copyrighted content grown. In order to express creativity, the practices require access to most contents which are copyrighted or protected by intellectual property laws. Though for several appropriations are permitted under circumstances and requirements, somehow the complexity of requirements and the copyright protective action, create uncertainty among the creative practitioners. Therefore, practitioners decided to maintain that some intellectual property law needs to exist to protect cultural producers and make their work more freely available to others. This define the open source culture.

Open Source Software (OSS) is part of open source culture OSS can be defined as computer software for which the human-readable source code is made available under a copyright license (or arrangement such as the public domain) that meets the Open Source Definition. The Open Source Definition is used by the Open Source Initiative to...
determine whether or not a software license can be consid-
ered open source. This permits users to use, change, and
improve the software, and to redistribute it in modified or
unmodified form. It is very often developed in a public, col-
laborative manner. The Open Source Initiative (OSI) was
formed in February 1998 by Eric S. Raymond and Bruce
Perens. Raymond also suggest that software development
should be using bazaar style development, instead of cathe-
 dral style.

The open source movement is based on the idea of a
global collective working voluntarily and without financial
compensation in developing software code. Teams and in-
dividual computer programmers around the world work col-
lectively in improving the source code for software pro-
grams. Open source software such as GNU/Linux is soft-
ware where the author (the licensor) gives some funda-
mental freedoms to the user (the licensee), inside a license
agreement:

- The freedom to study how the program works, and the
freedom to adapt the code according specific needs. 
Access to the source code is a precondition for this;

- The freedom to improve the program (enlarge, add
functions);

- The freedom to run the program, for any purpose and
on any number of machines;

- The freedom to redistribute copies to other users.

As the cost of technology and digital media begun to drop
in the late 20th Century, the possibility of duplicating and
transmitting digitally via digital media became available.
Digital media duplicating, access and transmitting applied
as the ownership of technology and personal computer owner-
ship grown exponentially. Consequently, the growth in
open source culture is facilitated. Another technology con-
sidered to essential to open source culture, is the Internet.
Using Internet as digital media access and as global net-
work in order to redistribute the information and cultural
background inexpensively. Internet facilitates the modifi-
cation of user cultures. Users are capable to communicate
with each other across international and cultural boundaries.
The speed in which digital media travels on the Internet in
turn facilitates the redistribution of culture.

Those translation experiences are taken from the WinBI
Project, the work in developing WinBI was about three
months and there were 30 translators and 3 developer who
are involved in the development. Most of them are students
and staffs of Gunadarma University. The works was started
by using Trustix Merdeka as the starting point, since the
Trustix Merdeka has already many component which has
been translated. Therefore, before starting the translation
project we evaluated the Trustix Merdekta. The distro de-
v elopment was performed by different groups such as trans-
lator for PO and DocBook files, programmers, graphic de-
signer, and evaluators.

Therefore, the results of this projects was not only the
WinBI, but the PO files which can be used for other transla-
tion project or other Distro. It also submitted to the KDE
as Indonesia localization. The translated phrase collection
are also available for public in a form of parallel corpus. As a comparison, in 2004 there was a collaboration project
between Microsoft with Bandung Institute of Technol-
yogy to translate MS Windows XP. It took about 1 year to
produce translation of Microsoft Windows XP menus (lan-
guage pack of Windows XP). However, this translation have
not produced online help or other programs in MS Win-
dows, only the menu in MS Windows XP desktop. Compar-
ing with WinBI, which also produces online Help of desk-
top system and various application programs localization
result from Microsoft was smaller [11].

Comparing time required by Microsoft localization
project, WinBI project produced more results in shorter
time. The translation Windows XP could not performed
as fast as WinBI because translator team cannot compile the
language packs, or performing the test by their own. Translators had to send the result to Microsoft before get-
ing the final system. Translators also cannot build the tools
by themselves. Thus, depends on the tools provided by Mi-
crosoft. Moreover, the translators might not use the trans-
lation results from various localization FOSS due to the li-
cense restriction. Beside faster, WinBi was also done with
smaller budget. Cost consideration is a critical factor for
developing countries.

The result translation effort of Open Source Software
such the translations, translated phrase database, tools, user
and developer documentations are always available for pub-
lic. It creates possibility for other developer groups to start
the translation effort faster as well as to continue the works
of other translators. It is also demonstrated the continuation
of Open Source Software without the involvement of the
initiator. The result of localization project from proprietary
software may not be used by other groups without getting
permission from the vendor. For developers in developing
countries establishing the vendor permission is not an easy
task. Thus, whenever the initiator or the vendor do not want
to continue the project, the work cannot be sustained. FOSS
provides a better platform for delivering sustainable local-
ization solutions, such as for mobile devices..

8 Open Source Platform for mobile application

Open Source Software has also been exploited in the mo-
bile platform. For example the famous iPhone uses We-
Table 1: Operating System market in 2007

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Market share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbian</td>
<td>65</td>
</tr>
<tr>
<td>Windows Mobile</td>
<td>5</td>
</tr>
<tr>
<td>iPhone</td>
<td>7</td>
</tr>
<tr>
<td>Blackberry</td>
<td>11</td>
</tr>
<tr>
<td>Linux</td>
<td>5</td>
</tr>
</tbody>
</table>

bKit as the rendering engine. The Webkit itself [http://www.webkit.org] is originated from the KHTML and KJS which is used by the Konqueror from the KDE Project. Apple had chosen KHTML due to the speed. The Webkit is now released as the Open Source project. The Webkit is used for many mobile platform application such as Adobe Integrated Runtime as well as Qt.

As reported by Canalys [http://www.canalys.com] in Table 1, Linux is still only 5%. However if we consider the Open Source is not only the Operating System but also the platform such as JavaMobile, or Qt, Open Source has bigger market in the mobile market. The market of Linux is strong in a country such as Japan or China, because the IT industry in this country require a platform which can be customized to fulfill their local need without dependency with other companies.

Open source is the emerging development methodology for mobile phones, reducing operational costs, harnessing innovation and shortening time to market for new devices and services. With both Nokia and Google already choosing an open source model for their mobile platforms over the past twelve months, the pressure is on independent software vendors (ISVs) in the mobile market to adopt an open source strategy.

There are possible Open Source platform for mobile devices such as:

- **Java ME** [http://java.sun.com/javame] provides a flexible environment for applications running on mobile and other embedded devices such as mobile phones, personal digital assistants (PDAs). It includes user interfaces, security, built-in network protocols, and supports for networked and offline applications that can be downloaded dynamically. Applications based on Java ME are portable across many devices, yet leverage each device’s native capabilities. A widely adopted example is to combine the CLDC with the Mobile Information Device Profile (MIDP) to provide a complete Java application environment for mobile phones.

- **Android** [http://code.google.com/android/] is a software platform and operating system for mobile devices, based on the Linux kernel, developed by Google and the Open Handset Alliance, a consortium of 34 hardware, software, and telecoms companies devoted to advancing open standards for mobile devices. Applications can be written in the Java language. Applications written in C and other languages can be compiled to ARM native code and run but has not been officially supported. The Android architecture is designed to simplify the reuse of components. Any application can publish its capabilities and any other application may then make use of those capabilities. These capabilities are exposed to developers through the Android application framework.

- **Qtia** [http://www.qtokia.net] is an application platform for Embedded Linux-based mobile computing devices such as personal digital assistants, mobile phones, and web pads. It is being developed by Qt Software, a subsidiary of Nokia. Now it is known as Qt Extended.

- **Opie (Open Palmtop Integrated Environment)** [http://opie.handhelds.org] is a graphical user interface for PDAs and other devices running Linux. It is a fork of Trolltech’s Qtopia environment. It features a personal information (PIM) framework as well as several other productivity applications. It has also extended multimedia capabilities, document model, networking and communication tools. It uses common industry standards like XML, Obex, IrDa et al. Opie images and applications can be built for most devices supported by OpenEmbedded.

- **GPE (GPE Palmtop Environment)** [http://gpe.linuxtogo.org/] is a collection of integrated software components optimized for Linux handheld and resource limited devices. It provides PIM (calendaring, todo management, contact management and note taking), multimedia (audio playback and image viewing) and connectivity solutions (web browsing). This infrastructure is built on available technology including GTK+, SQLite, DBUS and GStreamer and several more common standards defined by FreeDesktop [http://www.freedesktop.org].

- **OpenMoko** [http://www.openmoko.com/] is based on the latest Linux open source efforts, it enables developers to create mobile applications and deliver services that span all users and provide a common “look and feel”. OpenMoko also offers common storage models and libraries for application developers, making writing applications for mobile phones fun and easy while guaranteeing swift proliferation of a wide range of applications for mobile phones. Smart-
phone Neo1973 from FIC as well as NeoFreeRunner is powered by OpenMoko.

Open Source in mobile application development also enables a new type of software. For example the combination of OpenMoko and KARMetasploit has opened the possibility the use of mobile devices for penetration test. The availability of source code enables the developers to modify and open new possibility of application of mobile devices. Developing a new application can be done by modifying the existing similar application. Developers do not need to start from the scratch.

9 Conclusion

Technology shapes society, but society also shapes technology [12]. Therefore, increasing the awareness of social expectation concerning technology in use is important to develop a mobile service solution. Balance the different aspect of requirements of people, organization and technology which make up complex socio-technical system within their social and natural environments, within processes of global networking.

Software engineering cannot be seen as pure development of technology, because it also induces a change process in the environment where it take places. The critical success factor is to adapt constantly the planning to any changes. Open Source provides a socio-technical infrastructure which can be adapted easily in the future. It is enabling the developing countries to fulfill their local needs. Furthermore, the specific requirement due to the local or cultural context can be fulfilled by using the local human resource. The localization project of OSS shows this phenomenon. By using smaller team, and require shorter time and smaller funding, better solution can be provided comparing to the same solution from proprietary vendor. From the economical consideration it is a good point for developing countries such as Indonesia.

Open Source opens the possibility for local developers to provide a mobile solution services which can be suited according to the local culture preferences as well as the usage context.

References


