An Exploratory Study of Arabic Language Support in Software Project Management Tools

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Abstract

Due to the increasing demand for software in managing software development projects, the need of Arabic project management tools to be used by Arabic native speakers is emerging. Moreover, since there is hundreds of effective English project management tools, some of these tools were Arabized to fulfill the needs of Arabic users. However, they lack applying some basic rules in Arabic language. This study addresses the most important consideration elements that must be followed when Arabizing software. Also, a systematic review on three project management tools, which are TeamworkPM, ProjectLibre and Microsoft Project, is conducted based on the proposed guidelines. This study concludes with some recommendations and suggestions, which can be used to improve the software project management tools in particular, and the wide range of software applications that provide Arabic language interfaces in general.

Keywords: *Project management, Arabization, Tools, Localization, Arabic language.*

1. Introduction

The Arabic language is one of the oldest languages in the world. Currently, it is the fifth most used language worldwide. It is spoken by a significant percentage of the world's population; approximately more than 290 million speakers speak Arabic as their native language [1]. As a result, Arabic is becoming an important language on the Internet due to the growing number of Arabic speaking online users seeking Arabic content and applications.

Recent figures from the Internet World Statistics show that there are 90 million Internet users from the Arab world [2], 2.5 million of these users are from Saudi Arabia [3], which is known to have one of the strongest economies in Gulf Council Countries (GCC) and is considered one of the largest markets of the world's major projects [4], due to its richness in natural resources in general and oil in particular. For the purpose of using its revenues to boost local economy, Saudi Arabia is investing heavily in large-scale development projects [5]. Therefore, the need for project management (PM) expertise is highly needed along with a project management tool that support the growing demand for an Arabic PM application that servers the Arabic speaker.

Software developers often face several challenges when attempting to Arabize any application, such as character sets and Internet standards. As a result, several global leading companies like IBM and Microsoft are trying to increase the customers from the Arab world by adopting the Arabic language in their applications. The goal of this paper is to examine three Arabized project management tools which are TeamworkPM, ProjectLibre and Microsoft Project from four angles. These angles are language, layout, culture and word segmentation.

In this paper, we first start by proposing guidelines to be followed when Arabizing tools. Section 3 follows it by reviewing these guidelines in the chosen tools. Next, in Section 4, we provide a discussion of the current issues and the possible approaches to solve them. Finally in Section 5, we conclude the paper.

2. Proposed Guidelines

The most important aspects that have to be considered in Arabic tools and their absence affects the customers' interaction with the software negatively are language, Right-to-Left (RTL) direction, culture and word segmentation.

2.1 Language

In order to localize a tool to a specific language, the first step is to understand their language rules and apply them to the interface that is being designed to fulfill the needs of the target audience in the targeted context. This study focuses on the Arabic language since it's a way of communication between Arabic and non-Arabic Muslims [7]. The following sections illustrate Arabic language from three angles which are the grammatical structure, the way in which the words are correctly spelled and the process of translating the words from the source language to Arabic language without changing their meanings [6].

2.1.1 Grammar and Spelling

To customize software to Arabic language, the grammatical structure and spelling rules of it must be adopted for the purpose of making the sentences clear, logical and understandable. Therefore, detection function should be executed in all applications that support Arabic language. For this reason, avoiding grammar and spelling mistakes is essential to gain the trust of the users. This can be viewed from two angles which are ensuring that there are no mistakes in the translated interface as well as providing a grammar-checker and a spell-checker in the software. For the spelling checker, having a reference word list (dictionary), an error model and a language model in the Arabic supporting tools is important [9].

2.1.2 Translation

Albalooshi and Aljaroodi [7] define the process of translation in the context of interfaces as "Communicating the meaning of some data and information from the original language into another intended language". Translating software to another language isn't an easy as it sounds because it can affect the usability of its interface negatively or positively. Online users can find intended content in their native language via translation process. Thus, if the translation is done successfully, it can increase the number of users of the software worldwide. There are two ways to translate a system into Arabic language, either by using the translators that are available as online tools and do the task automatically or by hiring a specialist who is an Arabic native speaker. The latter one is better, as it can provide meanings that are more precise [7] since there are tools that were translated from a specific language to Arabic language inaccurately. Moreover, changing the language of the system's interface involves translating the words written on the icons, hyperlinks, dialog boxes and menus.

Terminologies related to a specific area must be translated into the Arabic language in an understandable and a scientific way. Additionally, the terminologies shouldn't be written in its source language such as keeping the English terminologies as they are. Furthermore, the absence of the abbreviations in Arabic language adds more work on the translators, as they need to specify the complete words and provides a meaningful sentence [8]. Moreover, there are many dialects in the Arabic language and they differ based on the country, thus the Arabization must not be affected by these dialects. Ideally, Modern Standard Arabic (MSA) which is derived from Holy Qur'an has to be adopted. Another Arabic language consideration is numerals and Hindi digit shapes. Numbers in Arabic language are read from left to right. There are two possibilities for writing numbers in Arabic language: "Arabic digits"[1] (same as Latin numbers) and "Hindi shapes"[2], these two possibilities must be configured by the user of the system [10].

2.2 Layout

The interface design and the layout, which affects the look and feel of the project management tools, are influenced entirely by the writing direction. The interface layout should be aligned from right to left since the Arabic script is written in that direction. This means that the placement of the side menu will change to be on the right [8] [11] [12]. Consequently, the text alignment and the navigation should be from right to left. Additionally, if there is a logo it should be at the top-right whereas the scroll bar should be at the left side [13].

2.3 Culture

Culture is considered as one of the major aspects that affects any website, software or new technology. It has many factors like: environment, weather, religion, gender and economy. These factors are taken under consideration in producing or releasing a new version of such tool to a foreign country like European or Arabian countries due to increasing sells or spotlight reputation of the company. Hence, this section will highlight with more details on the vacations days, currency and Hijri calendar.

2.3.1 Working and Weekend Days [8] [14]

Official vacations days are categorized in two types, special ceremonies and official weekend days. For the former type, Islamic nations have two special ceremonies, which are "Eid-alfetar" and "Eid-aladha". The latter type is the official weekend days, which differ from one country to the other. For example, Yemen has a Thursday-Friday weekend, while Saudi Arabia, The United Arab Emirates and Qatar have a Friday-Saturday weekend, and finally both Lebanon and Tunisia have a Saturday-Sunday weekend. In a nutshell, you can infer that within the same region, each country has different occasions.

2.3.2 Currency [14]

American dollar is generally the most used currency worldwide. However, in most countries, project managers are requested to run their projects by using local currencies. For instance, almost all Saudi Arabian running projects are applying Saudi Riyal as the prime currency. For this reason,

[1] Arabic digits: (1, 2, 3 …).
[2] Hindi shapes: (١، ٢، ٣ ...).

this paper looks up for how TeamworkPM, ProjectLibre and Microsoft Project tools are supporting the local currency.

2.3.3 Hijri Calendar [14]

The Islamic culture has the Islamic calendar (Hijri calendar) that is purely a lunar calendar. It contains twelve months that are based on the phases and stages of the moon. The Hijri calendar is mostly used in the Islamic countries and in Saudi Arabia's governmental organizations and institutions. Said countries use the Hijri calendar in their work such as adopting it in projects' deadlines, paying employees' salaries, specifying vacations' days and the dates of releasing new products or decisions. Therefore, software and tools are required to provide both Hijri and Gregorian calendars to make all processes easier and suitable for the Islamic regions and culture. Moreover, since the Hijri calendar is strictly based on lunar cycles as mentioned before, which means that each year is eleven-days short of a solar year. Hence the start of each month will be different from one year to the next. Therefore, adding a feature of editing the dates (start of the month) should be applied.

2.4 Word Segmentation

The cursive nature of Arabic writings is one of the difficulties facing the developers of text recognition systems. Moreover, there are applications that support Arabic language; however, the words are segmented letter by letter and this is a major error that needs to be eliminated in Arabic applications. As a rule, there are different graphical forms (glyph) for the same Arabic character and it varies based on the location of this character. Some characters can be located at the beginning of the word (first letter) and connected with the second character (left side), or not connected (table 1.a). Some characters can be located in the middle of the word and linked to another character on either side, or both sides, or not linked (table 1.b). Some characters can be placed at the end of the word and linked to another character on right side, or not linked (table 1.c) [10]. All of these glyph types of the Arabic character must be considered in the tools that support Arabic language.

Table 1: Different Arabic Characters' Positions in a Word

a	*b*	*c*
صالح	الوليد	محمد
أسماء	الوليد	عدي
-	الامبراطور	-

In addition, several research studies addressed the segmentation issue and proposed different methods to split the words into characters to allow the processing of the language such as editing the words. [15] Presents nine techniques of segmenting the Arabic word and the pros and cons for each one. Another approach was discussed in [16], where its algorithm relies on extracting the segments from pre-specified points.

3. Project Management Tools' Review

Three project management tools have been selected to be evaluated according to the pre-mentioned consideration elements. Two of these tools are desktop-based ones, which are ProjectLibre and Microsoft (MS) Project and the remaining tool named TeamworkPM is a web-based one.

3.1 Language

3.1.1 Grammar and Spelling

Several spelling errors in the Arabic language have been noticed in the chosen tools. Firstly, TeamworkPM doesn't provide the spelling detection and correction features. For example, a basic spelling rule hasn't applied when we attempt to write this sentence as a title for a new project "موقع ألكتروني تججاري". In this example, there are two obvious mistakes which are the (أ) in the second word and the repeated letter (ج) in the last word. Furthermore, there are many spelling errors in its Arabic interface such as the word "ملاحظه" in the features tab of creating new project dialog box while the correct writing of this word is "ملاحظة". Secondly, ProjectLibre's interface doesn't include clear spelling mistakes; however, it doesn't detect and correct the typed spelling errors. Lastly, MS Project has a feature which allows the addition of new correctly spelled words to its dictionary and it detects/corrects the errors accordingly. Moreover, there are no apparent spelling mistakes in its interface. Turning to the grammar side of the Arabic language in these tools. All of the three mentioned programs don't support the detection and correction of the grammatical mistakes.

3.1.2 Translation

Four translation elements are addressed here which are the correct meaning of the translated words, English terminologies, abbreviations and Arabic numbers. The following table summarizes the translation errors in TeamworkPM that were noted by us (Wrongly translated words) along with its accurate meaning in English (Literal translation), the source English words (Intended English word) and the precise Arabic translation (The correct translation).

Table 2: TeamworkPM's Translation Mistakes

Tool Name	Wrongly Translated Word	Literal Translation	Intended English Word	The Correct Translation
TeamworkPM	منزل	House	Home	الصفحة الرئيسية
	بلدي تفاصيل	Description country	My details	معلوماتي الشخصية
	أنت تسير على هذا الحب	You are in love	You are going to love this	سوف يعجبك هذا البرنامج
	لون الموضوع	Subject color	Color theme	لون العرض
	الذين و عندما	They & then	Who & When	من و متى

In contrary, the Arabic translation in ProjectLibre and MS Project is almost accurate and leads to the correct meaning. As for the project management's terminologies and abbreviations, it is noticeable that the terminologies are translated in an understandable way and reflect the actual meaning in all of the three tools. Furthermore, all of them have considered the transformation of English abbreviations into complete sentences particularly ProjectLibre tool in which it provides accurate Arabic sentences along with their English abbreviations. What is more, the Arabic digits appear appropriately in TeamworkPM, ProjectLibre and MS Project whereas the Hindi shapes are supported only by MS Project.

3.2 Layout

As depicted in table 3, 4 and 5, layout is reviewed in this section by considering five points which are text alignment, side menu placement, scroll bar position, logo location and navigation.

Table 3: Layout Evaluations (TeamworkPM)

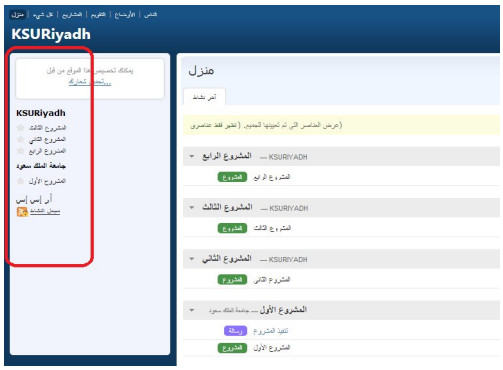
	TeamworkPM
Text Alignment	 The text alignment is from LTR while it should be from RTL.
Menu Place	 The menu is in the left while it should be at the right.
Scroll Bar	There is no scroll bar since it depends on the scroll bar of the browser.
Logo	 The logo is on the top left while it should be on the top right.
Navigation	 When you see the navigation you think that the opened page is : "جامعة الملك سعود" While it's: "المشروع الأول" The correct navigation is: جامعة الملك سعود >> المشروع الأول

Table 4: Layout Evaluations (ProjectLibre)

	ProjectLibre
Text Alignment	 The text alignment is from LTR while it should be from RTL.

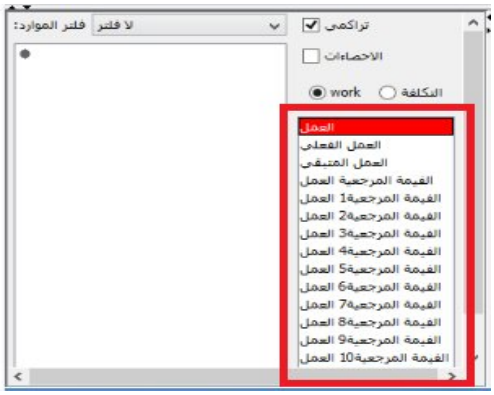
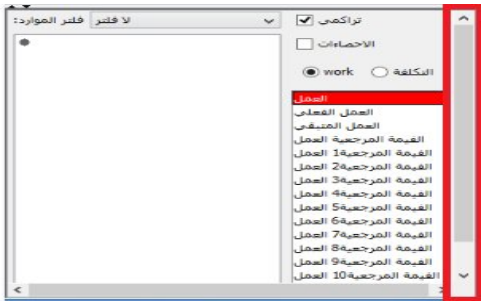
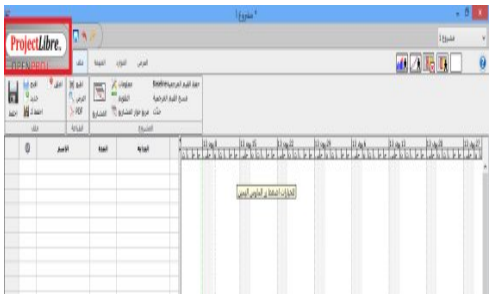
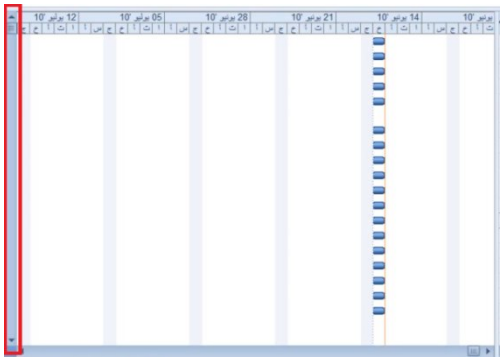
Menu Place	 The menu is on the right.
Scroll Bar	 The scroll bar is on the right while it should be on the left.
Logo	 The logo is on the top left while it should be on the top right.
Navigation	Didn't support the navigation criteria.

Table 5: Layout Evaluations (MS Project)

	MS project
Text Alignment	 The text alignment is from RTL.
Menu Place	 The menu is on the right.
Scroll Bar	 The scroll bar is on the left.
Logo	 The logo is on the top right.
Navigation	Didn't support the navigation criteria.

3.3 Culture

This section focuses on culture part by reviewing the working days, currency and Hijri calendar in the selected project management tools as summarized in table 6.

Table 6: Culture Evaluation

	Working Days	***Hijri Calendar***	***Currency***
Teamwork PM	No	N/A	Yes
Project Libre	Yes, but manual and only by user.	N/A	Yes
MS Project	Yes	Yes if the Computer's date is set as Hijri.	Yes

As illustrated in table 6, TeamworkPM has the ability to edit the currency; however it does not support changing the working days. Figure 1 shows that there are only two choices either to start the week at Mondays or Sundays and it don't support the Hijri calendar.

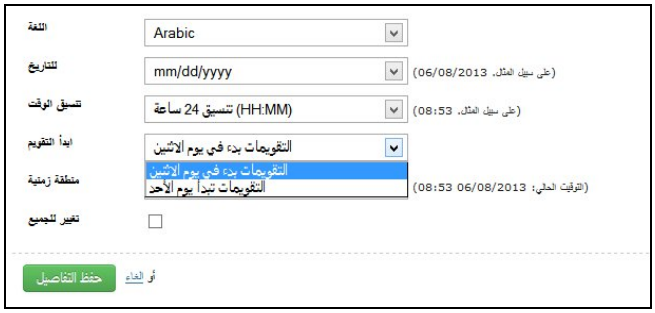


Figure 1: TeamworkPM Editing Calendar Start Date

As for ProjectLibre, it has the ability of changing the currency by default to be compatible with the language of the operating system. For example, S.R. is the currency adopted for Arabic operating system. Also it provides the option to edit the working days after performing some steps which are creating a new calendar and applying the changes on the days; however these changes should be made manually in each day and sort the days as shown in figure 2.

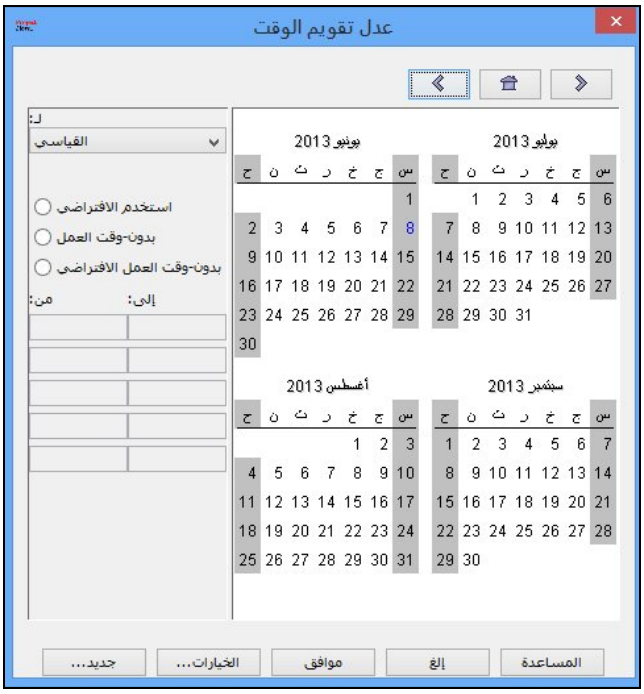


Figure 2: ProjectLibre's Editing the Working DaysFeature

Lastly, MS Project has a full feature that supports the Arabian culture, it can be easily configured and the changes will be applied immediately. Moreover, extra features can be obtained by downloading the appropriate plug-ins.

3.4 Word Segmentation

The cursive nature of Arabic writings and the different glyphs of characters are supported in all of the three tools.

4. Recommendations

Arabic presents several important content localization challenges, due to the poor software support and an acute shortage of Arabic translators. The American Translators Association (ATA) lists only 200 English-to-Arabic translators in its online directory, 21 of these 200 are ATA certified translators; this is compared to 2181 English-to-Spanish translators [17]. Moreover, Arabic is one of the more expensive languages to translate as it lacks many of the developments and refinements needed for dealing with modern business and technology. In this sense the Arabic language might be called a technologically under-developed language.

Technology has yet to make significant influence on the Arabic culture as it has in many other parts of the world. Hence, Arabic lacks many linguistic developments needed to deal with more technologically developed languages. Consequently, localizing from a language that is rich with

technical vocabulary for dealing with technical subjects like English, into Arabic entails translation, cultural adaptation of content, and overcoming the linguistic barriers between technologically developed and under-developed languages [18].

While it is not easy to express some computing or technical terms in the Arabic language considering the limited technical vocabulary in Arabic as mentioned in the previous paragraph, a qualified linguist is highly needed in order to create custom Arabic terms that accurately express the exact meanings of the source language terms.

Also, the Arabic language is a meaningful, expressive language, where a text can be expressed in various alternate ways. Therefore, machine translation and untrusted and less reliable linguistic resources does not work well with this language. The Arabic culture is known to have a significant difference from the Western or Asian ones; professional localization services are needed to address the needs of users from this historically rich culture [19]. For example some terms have ambiguous meanings when translated to Arabic using machine translation. Table 7, shows that both the words calculate and compute have the same Arabic translation, although they mean two different things.

Table 7: Ambiguities in Machine Translation

English Word	***Arabic (Machine Translation)***	***English Word***	***Arabic Meaning***
Calculate	حساب	Calculator	آلة حاسبة
Compute	حساب	Computer	حاسوب

While 290 million Arabic-speaking people span over 20 countries, recent studies have indicated that the overall available Arabic content on the Internet is rather small; that's why initiatives like Taghreedat[1] and Arabic Web Days[2] are focusing on boosting Arabic content on the internet, also to support more Arabic content, AltCity[3] and Global Voices[4], a network of bloggers and translators, launched Translation Fest (T_Fest)[5].

Collaborating with such initiatives like Taghreedat, which is a regional and international Arabic digital content community building initiative, can help the localization process, as this approach will ensure that the localized content is not machine translated, since the community will have to vote on all the translated terms along with suggesting other translation to the term if the existing ones are found not suitable. The initiative aims to build an active Arabic digital content community that enrich the quality and quantity of Arabic content on both the web and application translation, through crowd-sourcing to increase Arab users' contribution through original content projects, and projects geared towards localization and Arabization [20].

5. Conclusion

The proliferation of the Arabic language in online content and in software packages supporting Arabic interfaces is increasing, as it is one of the most widely spoken languages in the world [1]. This importance makes the companies and developers focus on this language and provide their products in the mother tongue of more than 290 million people [2]. In addition to the previous factor, many Arabic nations adhere to using the Arabic language in their formal communications and transactions especially in public sectors. In considering project management tools to manage and control enormous deals [5], some of these tools have misunderstanding in the main Arabic language guidelines particularly in translation, grammar and spelling. Moreover, they need to support the Right-to-Left (RTL) layout in the interface, Hijri calendar, working days aligned with the currency as general points related to the culture. Since the Arabic morphology varies (i.e. letters appear differently according to their location within a word), the tools should take care of the words' segmentation.

The aim of this paper is to highlight key issues that are relevant to the design of software project management tools to ensure full support of Arabic interfaces and adaptation to local contexts. To reach this stage, this paper reviews three different types of project management tools, which are TeamworkPM, ProjectLibre and Microsoft Project based on main Arabic language guidelines that were proposed. All these tools have been used and observed to sum up with recommendations that can enhance tools and increase the productivity.

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