

Socio-Cultural Aspects in the Design of Multilingual Banking Interfaces in the Arab Region

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Abstract. This paper reports on insights gained from investigating multilingual user interfaces designed for banking systems in the Arab Region. In this region, Arabic is the native language; however a plethora of expatriates reside in the region who speak different languages. Three modes of banking interactions are examined in the local context; internet banking, automatic teller machines (ATMs), and mobile banking (MB). Reflections on interaction design for the three modes of banking illuminates the culture-orientated design considerations for banking interactions and demonstrates how users, in this case bank customers, shape technological changes and influence interface design. The contribution of this research is threefold. Firstly, gain an insight into socio-cultural design requirements for banking interfaces; secondly, an exploratory survey of interface design considerations in the three modes of banking with a focus on multilingual aspects of the design; and finally, distil the findings into design recommendations for socio-cultural aspects that are relevant to the context of banking interactions in the Arab Region.

Keywords: ATM · Mobile banking · Online banking · Heuristics · Usability

1 Introduction

Banking interfaces are designed to provide a secure mode of communication for customers to access their bank accounts. Banking interfaces that reflect socio-cultural factors can provide meaningful interactions that reflect users' local context as well as providing them with social, personal, and symbolic cultural values. These aspects consequently facilitate user acceptance, and can positively influence the user experience (UX) in interacting with banking interfaces as well as the customer experience (CX) in commercial and personal banking. Users involved in banking interactions in the Arab region include native Arabic-speaking populations in addition to an expatriate community residing in these countries who predominately speak English or French as their first language (e.g. English-speaking expatriates in the Gulf region, French-speaking

natives and expatriates in the North African Arab region). The expatriate community often constitute more than one third of the population in some countries in the Arab region, and thus user-centered socio-cultural banking interaction design is imperative for high usability in banking interfaces and for providing good user experiences for these banking systems.

The context of this study is Saudi Arabia, where one-third of the population is non-Arabic speakers with varying proficiency in technology usage, socio-economic backgrounds, and consequently different interaction design requirements [1]. Banking systems often cater to the requirements of target user populations by offering bilingual interfaces in Arabic and English. The penetration of mobile devices in Saudi Arabia is amongst the highest in the world, with comparable adoption rates across socio-economic levels in the population [2]. Hence, examining socio-cultural aspects of design are particularly relevant to this region to gain insights into the key requirements for service and delivery of technology solutions in banking interactions. Three modes of banking are prevalent in the local context; namely, internet banking, automatic teller machines (ATMs), and mobile internet banking (MB). An examination of interaction design for the three modes of banking illuminates the history and culture-orientated design considerations for electronic banking interfaces and demonstrates how users, in this case bank customers, shape technological changes and influence interface design [3, 4].

In recent years, there has been a proliferation in research examining design consideration for Arabic Interfaces [5–7]. Banking interface design issues have been reported in the HCI literature for several decades [8, 9], and recently, specific scopes of research have emerged in ATM related literature such as accessibility for user populations with disabilities and the elderly [10]. To date, our understanding of the socio-cultural factors in the design of banking interfaces in the Arab region is limited [e.g. 11, 12]. HCI studies related to the broad scope of Internet Banking have looked at interaction and design issues in different cultures and for different user groups [13, 14]. However, the socio-cultural design considerations for Arabic banking interfaces remains to be an unexplored area of research and inadequately examined.

The contribution of this paper is threefold. Firstly, gain an insight into socio-cultural design requirements for banking interfaces; secondly, conduct an exploratory survey of interface design considerations in the three modes of banking with a focus on multilingual aspects of the design; and finally, distil the findings into design recommendations for socio-cultural aspects that are relevant to the context of banking interactions in the Arab Region.

2 Design Considerations for Banking Interactions

Designers of banking interfaces in the Arab region have not yet been able to encode cultural phenomena to the same extent as human factors (e.g. cognitive and physical) in designing devices and interfaces [7, 9]. Research has suggested that designers need to specify, analyze and integrate socio-cultural factors in the early stages of the design to understand the human factors relevant for banking interactions (e.g. [15]). Khashman and Large [5] conducted a study that considered the design characteristics of government

websites in different Arab countries. Interestingly, Hofstede's culture's model was found to be inadequately reflected in the interfaces reviewed in that study [5].

Banking interfaces in the Arab region often toggle between left-to-right (LTR) and right-to-left (RTL) screen orientation in Arabic script and Latin script interfaces, and support bidirectional scripts for Arabic letters, digits and embedded charts/diagrams. Text and navigation in banking interactions cascade to the left in Arabic interfaces, and cascade to the right in English/French interfaces. Most items in the Arabic bidirectional interfaces are mirrored by comparison to the English/French versions of the interfaces. In addition to the layout of banking interfaces, directionality may affect the navigation, alignment in tables, collated images, and pop-up windows or scrolling messages. Notably, the process of producing mirrored versions of these banking interfaces is straightforward. The functionality associated with the navigation (e.g. back, next), undo and redo icons, confirm and cancel buttons, may require relocation, rather than a simple mirroring of the graphics.

In the following sub-sections, we present an overview of banking interactions offered to customers beyond branch-based banking. This includes previous research on ATM and Internet banking on web interfaces and mobile applications.

2.1 ATM-Based Banking Interactions

In recent years, researchers have examined human factors in the design and usability of ATM banking interactions. Such studies have generally focused on the design considerations of ergonomics, location, and accessibility for specific user populations such as the elderly or individuals with declining or limited abilities (e.g. visual, physical, cognitive) [10–12]. Although design recommendations have been reported for interfaces for different languages and cultural contexts [e.g. 13], little attention has comparatively been paid to design considerations for Arabic interfaces of ATM banking systems in the Arab region.

2.2 Web-Based Banking Interactions

The interest in Web-based Banking (WB), Internet Banking (IB) and E-banking has grown rapidly following the increased adoption of communication and Internet technologies. Notably, online banking started in 1995 in the United States of America, when the Presidential Savings Bank offered its customers an online service as an alternate to traditional banking [16]. A similar pattern of increased diffusion of web-based banking interactions was observed in our local region. In Saudi Arabia, the Saudi Money Agency (SAMA) has recently reported that the number of bills that have been paid using the national Electronic Bill Presentment and Payment (EBPP) system named as SADAD jumped 107 % in the period between between 2009 and 2014 [17]. An increased recognition of the importance of culture-oriented models of technology adoption is evident, as noted by a survey of Internet banking in Jordan, conducted by Siam in 2006 [18]. In this survey, it was emphasized that banks need to consider adopting Internet-based services to achieve a competitive advantage for providing customers with efficient, convenient, location-independent banking transactions [18].

2.3 Mobile Banking (MB) Interactions

With the rapid advances in communication technologies and mobile devices, using Mobile Banking (MB) has become an important alternative to branch, ATM and internet web banking for customers who are often on-the-move. A recent study has suggested that using mobile banking in the US has grown from 38 % to 42 % and reached 46 % for years 2013, 2014 and 2015 respectively [19]. In China, the rise in the number of mobile banking users has been reported from 10 % to 25 % in the timeframe between 2010 and 2011 [20]. In Saudi Arabia, with a population not exceeding 30 million, the total number of mobile subscriptions reached around 50 million with a penetration rate reaching 165.1 % in 2014 [21]. This high penetration rate was accompanied with an increased interest in providing mobile banking service from the banking sectors.

In our local context, mobile banking emerged in August 2010 with the application Samba Mobile for *Samba Financial Group* (Samba). Since then, all 12 banks in Saudi Arabia started releasing their mobile applications for both iOS and Android. The gradual diffusion of MB in Saudi Arabia is depicted in Fig. 1. Mobile banking diffusion was coupled with the high penetration rate of mobile devices and fast growing capabilities of mobile phones, which are two key drivers for MB services [22]. Other drivers include trust, ease of use and cost effectiveness. Interestingly, evidence from our exploratory study that we carried out in Saudi Arabia on banking customers suggests that 54 % of them used mobile banking as the preferred banking scheme compared to 44 % preferring to use web banking.

3 Heuristics Evaluations

The banking interfaces were inspected using Nielsen's heuristics [23]. Each system was evaluated by selecting key interfaces (such as the login screen, balance statement and transfer to an existing beneficiary) and applying the heuristics consistently across the three modes of banking. The review was conducted by the HCI team in addition to data gathered from an exploratory study for each banking interaction type with a selected sample of users from our local context. A representative sample of three banks was selected based on the popularity in the region [17]. The considered banks are Alrajhi, Riyadh Bank and Alahli banks referred to as B1, B2 and B3 respectively. We present the overall heuristic evaluation and describe each banking interface's design considerations separately (Table 1).

3.1 ATM

For ATM interactions, the ergonomics and visual design of interfaces varied across the sample of banking interfaces. The location of ATMs is an important factor in design, especially in desert region in which bright sunlight impacts visibility of the interfaces in exposed locations. Banks are increasingly addressing this problem in ergonomics, location, and human factors as it directly impacts the user experience in our local context. With regards to the flow of the interfaces to meet the wide spectrum of users, consistency in flow emerged as a design issue often overlook in local interfaces. For

Table 1. Aggregate evaluation of the three types of banking interfaces, B1, B2, and B3

Heuristics	ATM Banking			Mobile Banking			Online Banking			All		
	B1	B2	B3	B1	B2	B3	B1	B2	B3	B1	B2	B3
Visibility of system status	5	2	4	5	3	3	5	2	3	5	2	3
Match with real world	5	4	4	5	4	5	5	3	1	5	4	3
User control and freedom	4	2	3	5	5	3	5	5	5	5	4	4
Consistency and standards	4	2	3	4	2	3	4	2	3	4	2	3
Error prevention	5	2	4	5	4	3	5	3	3	5	3	3
Recognition rather than recall	5	5	5	5	3	5	5	3	1	5	4	4
Flexibility and efficiency	5	3	5	5	3	4	4	3	4	5	3	4
Aesthetic/minimalist design	5	2	5	3	5	5	5	1	2	4	3	4
Error Recovery	5	2	4	5	3	3	5	4	3	5	3	3
Help and documentation	2	2	2	5	5	2	5	5	5	4	4	3
Total	45	26	39	47	37	36	48	31	30	47	31	35

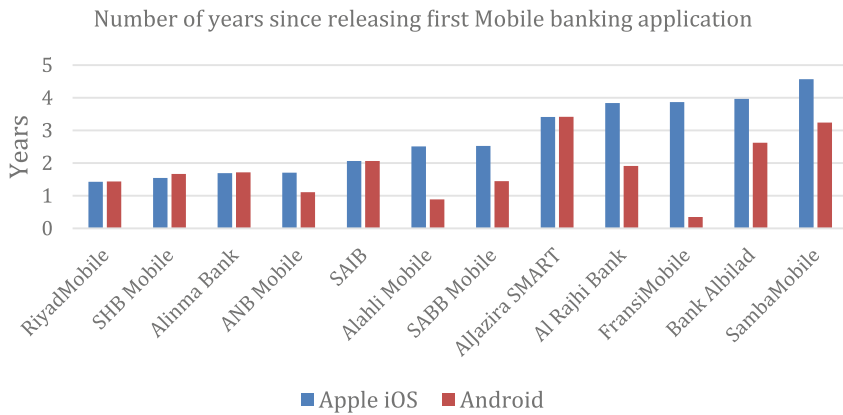


Fig. 1. Number of years since releasing first Mobile Banking application (from 2015)

example, the interface for the login was bidirectional and the language was prominently displayed for system feedback in guidance messages and in error messages. An example is shown in Fig. 2.

Error messages varied in their design from subtle cues to visually salient indicators to attract users’ attention to the problem. For the main transactions in ATM interfaces, the options are often listed as icons with text-labels and in some interfaces, aligned with physical buttons located on both sides of the visual display. Information to help the user detect errors consists of indications provided during normal operations (e.g. three wrong password attempt the bank will block the user’s account) [24].

Balance Inquiry is one of the options in the main menu where users check their balance. The structure and layout of the screen varied across the banking interfaces.



Fig. 2. Arabic and English interfaces of Alrajhi bank's ATM (B1)

Users noted that displaying more data in these transactions often hinder the sense-making process of completing the transaction. For the sub transactions in balance inquiry screen, the options listed are often related to the main option (Balance Inquiry). The readability of the text in the sub-transactions also varied across the three banking interfaces. Concerning minimalist design, B2 had higher density in the visual design and was perceived to be more cluttered compared to B1 and B3. Regarding the transfer function operation, the sub options are similar among the three banks interfaces. All the three banks require the user to enter the beneficiary Account Number or International Bank Account Number (IBAN) whether it was registered or not. With regards to visibility of system status, B2 lacked notifications in a multistep process such as the transfer transaction and balance statement. For B1, it scored higher in visibility as their design incorporates salient indicators of error such as a red X mark when compared to B3, which uses color-coded data entry fields, or color-coded subtle message.

With regards to user control, B1 fared better than the two others due to the availability of a home/escape link to previous pages on the navigation trail, whereas the other interfaces lacked this. In reviewing error prevention designs, it was noted that the multi-step process notifications were not communicated in time for users. For example, the bank statement lookup option requires authentication; however the incorrect password message is not displayed until the user proceeds to the second navigation layer. Another example is the action of withdrawing the bankcard by the machine, in which no warnings were issued to the user. The heuristic of "recognition rather recall" was sufficiently addressed in the interfaces reviewed. For flexibility and efficiency, the B2 interface was rated lower than other bank interfaces due to complexity in navigation and displaying information in dense interfaces. In aesthetics heuristics, B2 scored lower due to font selection, clutter and salience of key information. For the user control and freedom heuristics, a socio-cultural design consideration is the flexibility in selecting the language of interaction, which was sufficiently addressed in the banking interfaces. The issue with help and documentation was adequately addressed, despite the lack of options available for live user assistance (e.g. some interfaces provide customers with contact number whereas others provide a phone connection adjacent to the machine).

3.2 Web-Based Online Interfaces

For web-based online banking interfaces that we examined, the login interfaces supported both Arabic and English and the contents of the pages are similar in both languages with mirrored alignment as shown in Figs. 3 and 4.

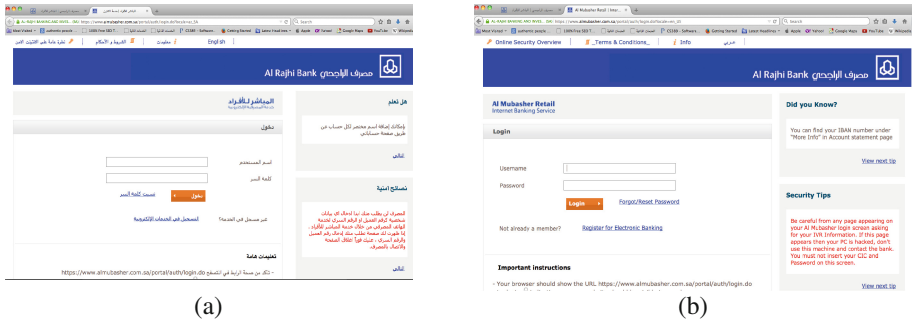


Fig. 3. (a) Arabic and (b) English web interfaces of Alrajhi bank (B1)

Error messages in failed login attempts in banking interactions varied from one bank to another. Variation was in color, content and options presented to the customers. Interfaces of B1, B2 and B3 allowed three unsuccessful attempts, and after that account would be suspended for security reasons. Nevertheless, only one of these banks, B1 show a meaningful warning message of how many attempts the user is allowed to do before account suspension as shown in (Fig. 4).

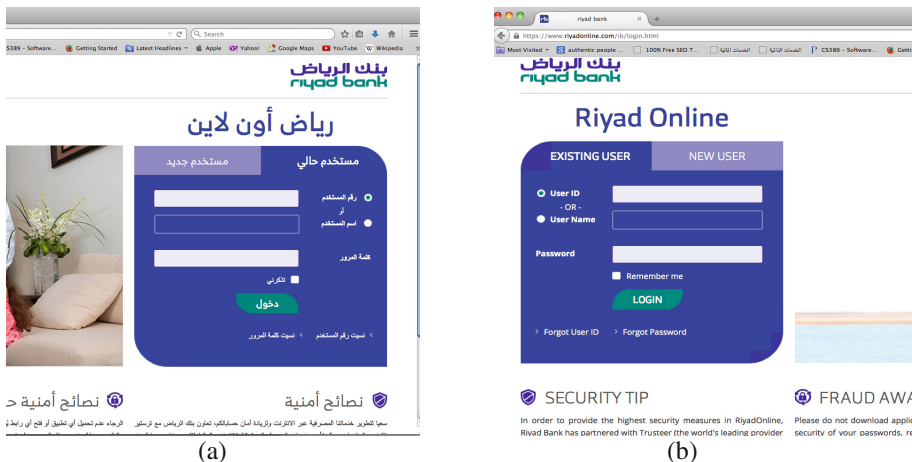


Fig. 4. (a) Arabic and (b) English web interfaces of Riyad bank (B2)

For the main transactions in the web-based banking interfaces, the options are often listed as main menu and submenus. Visibility of system status was inconsistent across

banking web interfaces. The banking system should always keep users informed about what is going on, through appropriate feedback such as warning messages, visual cues, auditory cues, within reasonable time. B1 adhered to best practices in the design of warnings (e.g. in the case of number of unsuccessful trials). It was stated clearly to users, with a salient red color, the consequence of exceeding the number of trials .

In a cultural-model of design, banking interfaces would need to speak the users' common language and avoid technical jargon, or unfamiliar phrases. In our review, we found that B1-B3 provide insufficient user control over the transactions. For example, in B2, if a user chooses to login using the English interface, the user could not change to the Arabic interface during the same session.

Inevitably, users are prone to fall in some errors while using the banking system. However, a smart system design limits the number of errors by employing different techniques. Using warning messages, meaningful icons and alerting colors are some examples. B1 uses clear warning messages for unsuccessful login with a red color that catch user attention before deactivating user account. On the other hand, B3 uses an orange color for unsuccessful login without showing how many attempts the user will have. Interestingly, B3 uses this color for different kind of messages such as confirmation messages, warning messages, and error messages. Consistency across banking interfaces designed for the same cultural context was surprisingly lacking.

Interfaces allowed different levels of customizations (e.g. B1 allowed creating a favorite menu of transactions and adding special names/tags to the beneficiary of transactions). Variations in density and navigation conventions were observed. For example, B1 contains redundant options in the main and sub-menus in the same interface on the top and on the left side, which causes confusion for the users whereas B3 uses shortcut menus for all the main headings with corresponding sub-options.

3.3 Mobile Banking Interfaces

Design considerations for mobile banking (MB) interfaces are to some extent similar to web interface requirements with some considerations specific to orientation, size and accessibility constraints. Negative space in mobile interfaces is especially relevant to support ease of navigation and interaction in various contexts of use. The two most common platforms for MB are Apple iOS and Android [25, 26].

The login interface banks B1-B3 support both Arabic and English entry points. The content of the pages are similar in both languages and mapped to the corresponding alignment. An example is shown in Fig. 5.

Interfaces for failed login using a correct user name and wrong password were examined both in English and Arabic interfaces, Fig. 6. Inconsistency was found between Arabic and English system messages of the same banking system as in B2. While B1, B2 and B3 allowed 3 unsuccessful attempts before suspending the account for security reasons, only B1 showed a warning message of how many attempts allowed before account suspension. Notably, this was the case in web interfaces of B1 as well.

For the main transactions in mobile interfaces, the options are often listed as meaningful icons selected from our local cultural context of understanding, coupled with textual labels as shown in Fig. 7 for B3.

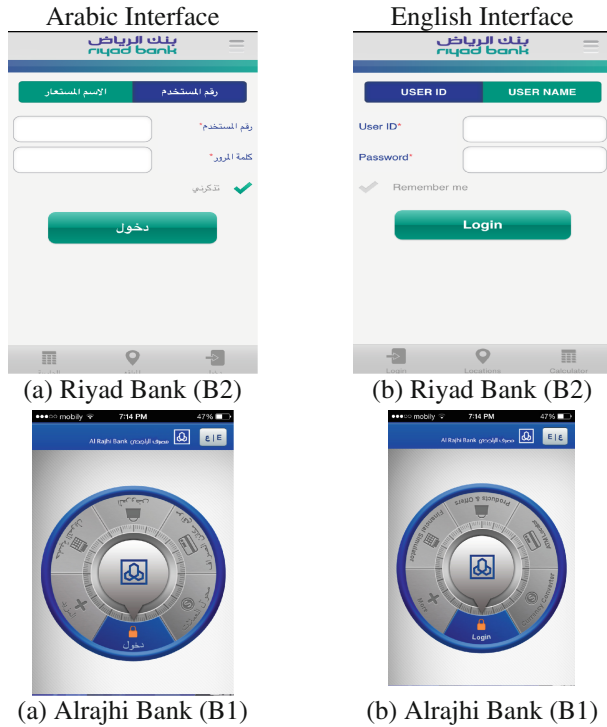


Fig. 5. Arabic and English MB interfaces of Alrajhi bank (B1) an dRiyad Bank (B2)



Fig. 6. Arabic MB interfaces for wrong password attempt in B1-B3

In our heuristics review, we noted that the MB interface design inadequately supported visibility of the system’s status. For example, B1 and B3 showed the cost of transfer from one account to another account, while B2 provided ambiguity in the multi-step process. The MB interfaces’ language, colors and notation were found to be consistent with the socio-cultural contexts of target users. For example, B1 has meaningful and expressive icons on the main menu. However, it was noted that B3



Fig. 7. (a) Arabic and (b) English MB interfaces showing main menu in bank3

used some of the same icons for different functionality, which often hinders user from adapting to new interfaces.

An example of error prevention found in many MB is a menu item being ‘greyed out’ or deactivated. It stops the user from using a function that shouldn’t be used in that situation. In many situations, it is effective for the MB interface to do suggestions and intelligent guessing. Offering that to the user to choose from rather than having the user to memories or look for operations that are expected to be performed. For instance, B2 shows the recent bills that are not paid yet on the login menu as a user reminder. Similarly, it’s good to be able to customize the MB interface by allocating a menu for frequent actions such as check balance and Pay bills to allow experienced users to perform the task without having to reach the main menu each time. MB interfaces can contain many features, and if they are all visible at the same time this can be overwhelming for a new user and would result in a crowded MB interface. Interfaces of B1, B2 and B3 varied on this feature, B2 in the login interface shows the latest transactions on the account with all details such as data, price and operation number.

4 Conclusion

This study explored the relationship between language, perceptions and beliefs of an individual’s culture in banking interactions in the Arab region, a topic on which there is little previous research. In this paper, we described the wide spectrum of socio-cultural factors in the design of banking interfaces in the context of Saudi Arabia. The main objective was to shed light on the social and cultural phenomena influencing interface design in banking transactions. This was achieved by applying heuristics to a selected sample of banking interfaces and observing users in the local context. It is recommended that banking interaction designers consult extensively with banking users to help them understand the requirements of a seamless and intuitive interaction with banking interfaces and design easy-to-use and efficient systems. Future work involves developing a culture-orientated design model to assist designers of banking interfaces in the Arab region with consciously integrating culture in their design practice.

Acknowledgements. The authors extend their appreciation to the Deanship of Scientific Research at King Saud University for partially funding the work through the research group project number RGP-VPP-157.

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