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SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜNE

Çeviribilim Anabilim Dalı, Çeviribilim Bilim Dalı'nda 010516YL03 numaralı Bekir Diri'nin hazırladığı "*Turkish Issues in Video Game, Web and Mobile Application Localizations*" konulu yüksek lisans tezi ile ilgili tez savunma sınavı, 13/12/2019 günü 14.00– 15.00 saatleri arasında yapılmış, sorulan sorulara alınan cevaplar sonunda adayın tezinin başarılı olduğuna oy birliği ile karar verilmiştir.

Prof. Dr. Işın ÖNER
İstanbul 29 Mayıs Üniversitesi
(Tez Danışmanı ve Sınav Komisyonu Başkanı)

Prof. Dr. Ayşe Banu KARADAĞ
Yıldız Teknik Üniversitesi

Dr. Öğr. Üyesi Nilüfer ALİMEN
İstanbul 29 Mayıs Üniversitesi

BEYAN

Bu tezin yazılmasında bilimsel ahlak kurallarını uyulduğunu, başkalarının eserlerinden yararlanılması durumunda bilimsel normlara uygun olarak atıfta bulunulduğunu, kullanılan verilerde herhangi bir tahrifat yapılmadığını, tezin herhangi bir kısmının bu üniversite veya başka bir üniversitede başka bir tez çalışması olarak sunulmadığını beyan ederim.

Bekir DİRİ

13.12.2019

ABSTRACT

Use of the Internet as a means of global communication gradually became widespread in the ‘90s. New terms have been introduced to translation industry such as Globalization (G11N), Internationalization (i18N), and Localization (L10N) with the global impact of the Internet. As to the translation industry in Turkey, the heavy translation demand of international companies wishing to get into Turkish market has confronted translation companies and translators with new challenges and problems. In this regard, this thesis aims at identifying common Turkish web, mobile application, and game localization problems and proposing solutions for them. Within the scope of the thesis, differences between localization and translation tools, the impact of transcreation on localization, and the reasons underlying web, mobile application, and game localizations problems are explored. Findings cover frequently visited websites, website applications, mobile applications and their help and support pages, PC games, console games (PlayStation and Xbox), online and mobile games. The solutions provided in the thesis are expected to be a useful resource for students of Translation and Interpreting Studies departments, prospective translators, and those who wish to obtain basic knowledge about localization in Turkey.

Key words: Localization, internationalization, game localization, web localization, mobile application localization.

ÖZ

Global bir iletişim aracı olarak internetin kullanımı 90'lı yıllarda giderek yaygınlık kazanmıştır. İnternetin küresel etkisiyle birlikte çeviri sektörüne Küreselleştirme (G1N), Uluslararasılaştırma (i18N) ve Yerelleştirme (L10N) gibi yeni terimler girmiştir. Türk çeviri sektörü açısından bakıldığında, Türkiye pazarına açılmak isteyen uluslararası şirketlerin yoğun çeviri talepleri, çeviri şirketlerine ve çevirmenlere yeni zorluklar ve sorunlar getirmiştir. Bu bağlamda tez çalışması web, mobil uygulama ve oyun yerelleştirmelerinde karşılaşılan yaygın Türkçe hatalarını belirlemeyi ve bu hatalara çözümler sunmayı amaçlamaktadır. Tez kapsamında yerelleştirme ve çeviri araçları arasındaki farklar, yaratıcı çevirinin yerelleştirmeye etkisi ve web, mobil uygulama ve oyun yerelleştirmelerindeki hataların altında yatan nedenler araştırılmıştır. Elde edilen bulgular sıkça ziyaret edilen web sitelerini, web sitesi uygulamalarını, mobil uygulamalar ile bunların yardım ve destek sayfalarını, bilgisayar oyunlarını, konsol oyunlarını (PlayStation ve Xbox), çevrimiçi ve mobil oyunları kapsamaktadır. Tezde getirilen çözüm önerilerinin, Türkiye'deki Mütercim-Tercümanlık bölümü öğrencileri, çevirmen adayları ve yerelleştirme hakkında temel bilgi edinmek isteyen kişiler için yararlı bir kaynak oluşturması beklenmektedir.

Anahtar kelimeler: Yerelleştirme, uluslarasılaştırma, oyun yerelleştirmesi, web yerelleştirmesi, mobil uygulama yerelleştirmesi

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Last but not least, I owe my greatest thanks to my brother Alper ÇALIK for his support.

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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
CAT	Computer Assisted Translation
CMS	Content Management System
etc.	and the others
e.g.	for example
G11N	Globalization
GALA	Globalization and Localization Association
GILT	Globalization, Internationalization, Localization and Translation
I18N	Internationalization
L10N	Localization
LISA	Localization Industry Standards Association
LQA	Linguistic Quality Assurance
LSP	Language Service Provider
OS	Operation System
QA	Quality Assurance
T9N	Translation
TM	Translation Memory

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INTRODUCTION

Global spread of new media contributes new localization areas to the industry like video games, websites, and mobile applications. Today, these video games, websites, and mobile applications are launched globally and these media are localized into Turkish and other languages. In this swift production cycle, these products are not well tested or controlled by a linguist to check and eliminate possible errors. As the demand for a new game, website and mobile application is getting higher every day, these “simple” errors are published by nearly every new website, game or mobile application. This thesis would focus on main reasons behind the Turkish localization issues and linguistic solutions for these issues in Turkish.

Many websites, mobile applications or games have Turkish versions in a variety of platforms like PC, mobile phone or game console. The widespread localization examples in Turkish contain systematical errors and these systematical errors lead wrong translations to be published in numerous platforms and devices. Wrong localization examples may result in misunderstanding of a simple command or function by users. To solve these issues, contextual localization approach has to be taught to translators and/or editors. A wrong localized word may affect function of a website, game or application.

Linguistic background is one of the core elements in translation and localization industry. Translators work in source and target segments and miss the context behind a very simple word, verb or pronoun. The limited context of text makes the translator translate or localize a verb as a word or even worse, misuse a polysemous (having multiple meanings) word. In contextual background, polysemous words, prepositions, feeling of the context, punctuation marks and so many other linguistic factors might mislead a translator. One simple word will affect all the localization process like butterfly effect.

Functional background is another crucial part in localization process. Translators and/or editors don’t need to know how to extract a text from a coding of a website or game. However, localization testers and engineers have to know this process and deliver a translatable format to linguists. This is one of the main problems behind the truncation or character corruption issues in game, website and application localizations.

I will investigate website, game and mobile application localization processes and in the end, I will compare the issues I encounter on my research. I would like to test any localization issue in website localization to check whether the same issue also creates the same effect or not in game or application localization. By this approach, I will differentiate common and unique issues in web, mobile application, and game localization and the outcome would create a basis for the following chapters of my thesis in localization fields. For example, how “short” can be translated into Turkish? How do you decide on it? These two simple questions will help my thesis to point the real problem behind mistranslation or localization process: contextual linguistic background.

In summary, I would like to ask about and focus on what common reasons lay behind Turkish localization issues in website, mobile application, and game localization are and I would like to find solutions to these issues. In the second part of my thesis I will check website, game and mobile application localization examples. I will investigate mobile and platform games, multilingual websites and mobile applications to create an “issue pool” to find a permanent solution.

General Outlook to GILT Industry and Issues

The idea behind GILT processes is to create a product suitable for any market or locale. Mass production, local demand, and linguistic issues would halt proper GILT processes and cause linguistic issues in the localized products. Such problems put websites, mobile apps, and games on the markets in a wrong way and in the end the products cannot be successful in target markets. Who wants to play a game with incorrect Turkish translations and adaptations? Who wants to visit a Turkish website with corrupted Turkish characters? And, who wants to use a mobile application with truncation issue?

What is behind these simple errors? Linguistic or technical limits? Or, literally translated words or phrases? Localization is a living body; when its translation part is completed, other dimensions like testing, marketing and launching the localized product are the things that have to be focused. If any translation company or linguist skips the second part, the localized product outcome will not be satisfactory for local consumers/buyers/gamers.

Technological CAT tool developments in localization industry can help localization teams and companies by granting context view, testing, and internationalization controls in one platform. Since the context and product are hidden from localization team, classic grid view and translation memory repetition function of CAT tools may lead wrong localized products. One approved TM entry may not be correct for all instances. Localization tools can create a separate string for any repeated segment and editors or proofreaders can take notes for strings for upcoming translation tasks.

Literal translation may pose a threat for any localization project as localization products are dynamic by their contents and users. Thanks to their dynamic content, localized products have many variables and these variables change depending on gender, name, school and many other data given by product user. All these variables have to be deeply considered in Turkish localization projects to eliminate possible localization issues in any project. Key for a successful localization in any project lays behind correct internationalization, transcreation, and testing steps.

Localization teams can make a product ready for the designated market by following internationalization steps and prevent possible oncoming internationalization issues like truncation on buttons, corrupted characters/letters, and left-to-right & right-to-

left language direction. Generally, internationalization is accepted as the first step of localization projects as target language optimization on product is done in this step. Without internationalization, many localization projects will encounter with issues presented in this thesis.

Transcreation, which will be presented detailed information about it in section 1.2., has been in translation and localization industry for about seven years. This term was suggested for creative translation by industry peers and used for defining customers' creative translation needs. Transcreation can solve many localization issues by keeping the same meaning and power of source text but changing the target text according to target languages' needs in localization text. A proper translation may not fit to a button but a transcreated text can fit into this button. Creativity is key for successful localization and thus transcreation would also be applied to localization projects for linguistic solutions.

Testing phase is one of the important steps of localization project management and its importance would be understood via examples presented in this thesis. Testing a product would eliminate possible translation, localization, and internationalization issues; contextual translation, truncation, character corruption, and more. Without testing, localized products may consist simple but critical issues.

Research Methods

My main research methodology will be practically testing websites' language functions, playing video games and testing mobile applications by comparing their both versions (English and Turkish). I encounter many localization issues by using a mobile application, playing a game, or surfing on a website. By checking interface of websites, I will collect some different cases and create a systematical approach to website localization. Localized games have also unique or common errors in their localized versions. Application's functional usages create another channel in localization and this will create a new approach to the application. In these three fields, I will spot the issues and find the relevant solutions for any situation which may be encountered in Turkish.

I will check relevant data in game, website and application localization trends and issues globally and then compare these with Turkish issues. These findings also help me to understand and rationalize linguistic background of these issues. Every single example will be evaluated in general for the three localization fields at the end and the data

collected will be evaluated in two scope: common and unique issues. Then, these findings will be categorized and arranged by their severity; from major to minor issues.

I will follow these steps to build my thesis; I will spot linguistic and technical issues in game, web and mobile application localization first; then I will explore common and unique linguistic and technical issues in game, web and mobile application localization. After all, I will compare all the data I found in game, web and mobile application localization examples. The compared data will guide me about how translator's competence affect the localization process and contextual view to the localization project in depth. Questionnaires will help me show how simple words can be problematic in localization process and how vital the context is. The outcome and contribution of this thesis will be eliminating common and unique linguistic and technical issues in game, web and mobile application localization, and will be a guide to successful localization in Turkish.

I hope this thesis would contribute to the Turkish localization and translation industry, language service providers and translation students by giving correct solutions for any localization issues frequently encountered in the translation industry. The solutions provided here are intended to be a guide to successful and smooth localization solution for anyone in the localization industry. These solutions were based on experiences encountered on localization processes in different time periods.

1. THEORETICAL FRAMEWORK

1.1. Skopos Theory and GILT

Translation theories have been suggested and developed by theoreticians for over decades but localization and internationalization texts would be examined under functionalist theories. These theories accept translation as an act of communication and understand meaning in terms of function in context. As functionality is important in localization texts, these theories can be useful for guiding translators, localization teams and whom involved in localization project. In *The Routledge Encyclopedia of Translation Studies*[1], Guy Cook describes functionalist theories as,

> The main point of functionalist approaches is the following: it is not the source text as such, or its effects on the source text recipient, or the function assigned to it by the author, that determines the translation process and the linguistic makeup of the target text, as is postulated by EQUIVALENCE based translation theories, but the prospective function or purpose of the target text as determined by the initiator's (i.e. client's or commissioner's) needs. (Cook 2009, 116)

Hans J. Vermeer's *Skopos* theory focused on function of text and according to this thesis, translation is determined by its purpose (*Skopos*) determined before starting translation process. This decision will shape the translation; action. Every translation project has a purpose and this purpose can be changed according to project, client, circumstances, and other needs determined by the purpose.

Localization texts' purposes may differ by their genres; web, mobile application, and game. A company can create a website, mobile application, and game for its new product. However, all these products would have different localization journeys as all these products have different audience and dynamics. For example, a website can be coded with PHP, HMTL; a mobile application can be coded with Java; and a game can be coded with Unity. Websites can be visited via mobile phones, PCs, tablets; mobile applications can be used in mobile phones, PCs, tablets, and games can be played in mobile phones, PCs, tablets, and game consoles. Audience and dynamic difference would

[1] Mona Baker and Gabriela Saldanha. 2009. *The Routledge Encyclopedia of Translation Studies*, 2nd ed. London: Routledge, p. 117.

affect translators, LSPs, and localization teams' localization purpose, methods and journey.

Vermeer[2] suggests three general rules for translation: *Skopos*, coherence and fidelity. These three rules would be determined by target market, country, community, and marketing strategies of company. According to *Skopos*, a Nazi flag in Jewish populated countries, a pink pig symbol would be removed from Arabic website, and color of a mobile application may differ in specific regions. Coherence and fidelity rules should always be observed in localization workflow as *Skopos* theory does not promote a free translation model. The translation has to have an intertextual coherence between the text and outcome of the translational action and be coherent to its audience; clear message should be transmitted.

In conclusion, localization workflow can be shaped by *Skopos* theory and this theory can be a guide for localization teams as three rules of it may sustain a stable roadmap for localization teams. *Skopos* theory can be implemented in every step of localization workflow: DTP, translation, localization, testing, marketing, and more. All these workflow steps have one in common: a purpose to reach audience.

1.2. Transcreation and GILT

Transcreation is a marketing term and suggested for copy-writing, recreation of text. In translation industry, this term is still a young one and can be interpreted slightly different. Minako O'Hagan and Carmen Mangiron[3] uses transcreation for game localization as "to explain the freedom granted to the translator, albeit within severe space limitations". They emphasize creative side of translation and translators' freedom to create translation text according to game players, genre, and etc. An USA-based translation company, Smartling[4], mentions transcreation as a creative approach to translation according to clients' need.

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[2] Hans J. Vermeer. 1996. *A Skopos Theory of Translation (Some Arguments for and Against)*, Heilderberg: TEXTconTEXT- Verlag.

[3] Minako O'Hagan and Carmen Mangiron. 2013. *Game Localization: Translating for the Global Digital Entertainment Industry*, Amsterdam: John Benjamins Publishing Co.

[4] Smartling, *Six Ways Transcreation Differs from Translation*. (Source: https://www.smartling.com/resources/blog/six-ways-transcreation-differs-from-translation/ (Accessed, November 9, 2018)).

Three questions may define a transcreation process: Who, where, why? These questions would be a key for transcreation answers of translators, LSPs, and localization teams. By asking these questions, a translator would understand the basic needs and limits of translation purpose. The question who would define the audience; age, sex, cultural background, and etc. The question where would locate the locale, regional differences, country affairs, political background, and etc. Finally, the question why would shape localization workflow by defining limits and purpose.

Transcreation in localization industry is used against literal, word for word translation. Dynamic content of localization would not suit only one translation for every time. Content may stay same but platforms, devices may differ so one translation would not be valid for every instance. Localization texts should be recreated via transcreation for fixing suffix, truncation, and contextual issues. I will present detailed examples and transcreation solutions about website, mobile application, and game localization.

2. TRANSLATION INDUSTRY DEFINITIONS

Translation, localization, internationalization and globalization terms have been in our lives for a long time and their chronological order starts with translation, followed respectively by localization, internationalization and lastly globalization. According to Pierre Cadieux and Bert Esselink[5], the term translation dates back to 14th century, Localization dates back to 1772, Internationalization dates back to 1864 and Globalization dates back to 1944. Pierre Cadieux and Bert Esselink check these terms by using the Merriam-Webster online dictionary[6] and create a table as below:

Term	Date	Definition
translation	14th century	rendering from one language into another
locale	1772	a place or locality especially when viewed in relation to a particular event or characteristic
localization	1792	to make local: orient locally
internationalization	1864	to make international
globalization	1944	to make global

Table 1. GILT Term Definitions **Source:** Pierre Cadieux and Bert Esselink, "GILT: Globalization, Internationalization, Localization, Translation"

These listed terms reflect their common meanings in dictionaries and their translation and localization industry meanings are slightly different from these literal meanings. These terms have gained new meanings after the digital millennium age: 1990, Internet conquered the whole world. Last twenty years, the Internet has been changing how we perceive and use the GILT terms, and workflow of GILT industry. Intense economic, technological and cultural changes affect the way GILT means for the GILT industry. Before Internet, "translation" is alone on the scene for academia and industry. However, when Internet came to our lives and changed the legacy perception of translation, and added new terms like globalization, internationalization and localization, GILT terms brought a new dimension and discussion to the scene. Academia and GILT industry first encountered with localization, then globalization and finally internationalization. Manufacturers' immense demand in new languages and markets

[5] Pierre Cadieux and Bert Esselink, "GILT: Globalization, Internationalization, Localization, Translation." (Source: www.i18n.ca/publications/GILT.pdf. (Accessed January 8, 2018)).
[6] *Merriam Webster Dictionary*. (Source: http://www.m-w.com. (Accessed February 15, 2018)).

starts localization journey in many new and undiscovered languages. With this journey, these terms have got their industry standards and explanations.

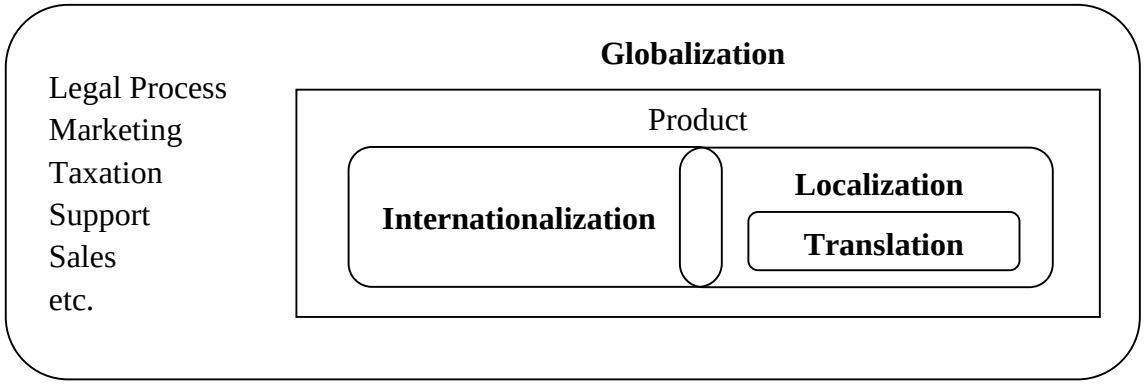

Table 2. GILT co-operation scheme

In translation and localization industry, these terms are frequently used by industry professionals in their daily lives, e-mails and conferences. Hence, some other professionals abbreviated these frequently used terms by counting the letters between the first and last letter. So, these terms are abbreviated as **T9N** (Translation), **L10N** (Localization), **i18N** (Internationalization) and **G11N** (Globalization).

2.1. Globalization (G11N)

Globalization term is widely used both in translation industry and global market as it is connected to marketing and spreading policies of companies. Every industry defines globalization according to the industry's dimensions, requirements and global aims. When we take a look at global companies like Coca-Cola, Google Inc., Facebook and etc. we can detect that they sell their products to whole world by talking local languages as locals. Even if a company had a great product, if it is not properly globalized, internationalized, localized and translated, it will not be successful in any country.

Spread of the Internet and new sales strategies create a new globalization era in translation industry. This new era triggers localization of new products, strategies for new markets and locals, and new challenges. Internet simply creates an online market for any company in the world and thus globalization becomes so vital for any company who wants to grow in new markets, locals and countries.

Pierre Cadieux and Bert Esselink cites globalization from IBM internationalization and Microsoft glossary. IBM defines globalization as:

> The process of developing, manufacturing, and marketing software products that are intended for worldwide distribution. This term combines two aspects of the work: internationalization (enabling the product to be used without language or culture barriers) and localization (translating and enabling the product for a specific locale).

On the other hand, Microsoft defines globalization as:

> Designing and implementing software so that it can support all targeted locales and user interface languages without modification to the software source itself. This processing includes enabling for all target languages, and adding NLS support for target locales.

Localization Industry Standards Association (LISA) describes globalization as:

> Globalization addresses the business issues associated with taking a product global. In the globalization of high-tech products this involves integrating localization throughout a company, after proper internationalization and product design, as well as marketing, sales, and support in the world market (LISA definition, Esselink 2000, 4).

Globalization covers two vital processes: internationalization and localization. These two processes have interchangeable and unique parts to sustain an optimum globalization experience. Pierre Cadieux and Bert Esselink[7] define a formula for globalization:

GLOBALIZATION = INTERNATIONALIZATION + N * LOCALIZATION

We can examine this formula as globalization has two processes and localization process can have multiple languages but internationalization only consists one step. Globalization strategies would decide how many localization locales and languages will be executed. Internationalization would be a core process for all languages to be localized as internationalization is neutralization process of the language, codes and any linguistic parts to be used in localized versions.

Globalization strategies may differ as the product differs. For example, globalization strategy for a website, a game, and a mobile application have different and unique processes and challenges. Such uniqueness in different globalization processes results from the products' dynamism and nature; even a company's same product for

[7] Pierre Cadieux and Bert Esselink, "GILT: Globalization, Internationalization, Localization, Translation", (Online) www.i18n.ca/publications/GILT.pdf.

different platforms (website, game, and mobile app) has a unique GILT journey each language to be localized. These strategic differences derive from unique nature of games, websites and mobile applications.

2.2. Internationalization (i18N)

Internationalization is the process of making a product technically ready to global market in which locales products are supposed to be used. Internationalized products can simply be optimized for any language locale and special characters (i.e. ç, ş, ı, ğ in Turkish), language direction (left to right, right to left and double byte [i.e. Japanese]), global and local metrics (inch or meter) and any other language specific variable. These optimizations' first step is to extract translatable text from source codes of the product.

> LISA describes internationalization as:
>
> Internationalization is the process of generalizing a product so that it can handle multiple languages and cultural conventions without the need for re-design (LISA definition, Esselink 2000, 2).

Internationalization plays a critical role in any localization process which has different journeys to any world language. Thanks to internationalization, any localized product can be used in its local language without any letter recognition problem, right-to-left or left-to-right language problem, double-byte problem, etc. Internationalization processes are crucial in web, mobile app and game localization projects; its application to any product makes the product localized easier by means of technical and post-localization issues (i.e. truncation, character corruption, date and time format and etc.).

Internationalization process has common and unique aspects and procedures for websites, games and mobile applications. The common processes for any product are design and engineering, and testing. A product's website and mobile app interface may contain the same data in both platforms but the internationalization checks won't be same for both platforms. Website may have enough space for writing a full date yet mobile application may not have the same space according to mobile device screen size and aspect ratio. A company's a game for different platforms (for example, EA Games, FIFA mobile and PlayStation 4 versions) may also have unique internationalization dynamics as the different platforms have their own localization and internationalization dynamics.

Internationalization can also be described as *neutralization* of the product be released worldwide. Such neutralized products may create less localization and internationalization issues compared to a locally produced or designed product. Commonly encountered internationalization and localization issues are caused by complex or culturally designed and written contents.

2.3. Localization (L10N)

Localization can be defined as a cultural and linguistic adaptation process chain which contains project management, translation, desktop publishing, engineering of product and testing for any target locale. LISA defines localization as:

> Localization involves taking a product and making it linguistically and culturally appropriate to the target locale (country/region and language) where it will be used and sold (Esselink 2000, 3).

Localization projects has pre and post processes like product preparation, analysis, desktop publishing (DTP), quality assurance and localization project management. In a product's global journey, localization plays a key role for a successful product launch by cooperating with internationalization.

Localization dynamics can differ for websites, games and mobile applications as they all have been coded with different coding languages. For example, a website can be coded with HTML, ASP or PHP, and a game can be coded with C++, Java or Lua, and a mobile application can be coded with HTML5, Objective-C or Swift. Even if coding of these three is the same, product dynamics will be different.

A product may have a mobile application, a computer program and a webpage version. These may have the same content but all of these products have to be localized and internationalized separately. Different platforms bring different needs (screen wide check, button function control and etc.) for localization teams.

2.4. Translation (T9N)

Translation is transmitting one written or spoken message, information or text from source language to target language. Translation also transmits original text's intention and message to the target text. By transmitting this message, translation also conveys cultural, linguistic and local specifications and differences of the source text to target text. Accuracy in terminology and translation are vital parts of translation process.

The history of translation is as old as the history of languages; people have been building their languages, they have started exploring continents and encountered with foreign languages. At that time, translation was conducted verbally and after a long while humanity has discovered letters and written language. As time goes by, humanity has discovered technology and advancements in the language technology shape the future of verbal and written translation.

Today, many companies, governments and people need and rely on translation daily. People can communicate with each other, market their product, defense her/himself, understand a museum's or gallery's descriptions and read a book by translation. Translation surrounds us and it is everywhere we look, touch and see.

2.5. Translation vs. Localization

Before Internet era, translation was a common, well-known and theorized term but localization was so new to translation industry. Scholars, translation industry leaders and company representatives, and many others tried to explain this new term "localization".

Esselink describes the difference as:

> Translation is only one of the activities in localization; in addition to translation, a localization project includes many other tasks such as project management, software engineering, testing, and desktop publishing (Esselink 2000, 4).

However, localization and translation terms are interchangeably used in many game, website, and mobile application practices. Minako O'Hagan and Carmen Mangiron conclude that game localization and game translation do still not have a clear-cut difference and also companies use "localization" term aim to create an effective image on game players and market.

According to these three scholars, localization differs from translation by the following steps; project management, desktop publishing, localization engineering, testing, and multimedia (sound, graphic or image) implementation. Translation is one of the steps of localization process. Localization covers all these steps mentioned and translation, too. These two terms, localization and translation are used interchangeably by many people in translation and localization industry as to express local

implementations, currency change and etc. However, the difference between these two terms can simply be defined as follows: Translation is a step of localization process.

Georges L. Bastin identifies the conflict between localization and translation as:

> A possible reason for the reticence of early translation scholars to address the question of translating advertising material may lie in the verbal connotation traditionally attached to the term 'translation', which may explain why the crosslinguistic and crosscultural transfer of multimodal promotional texts is often termed LOCALIZATION, ADAPTATION or (less frequently) transcreation or rewriting. The latter set of terms suggests a kind of transfer which is less concerned with issues of 'faithfulness' and more, perhaps, with functional EQUIVALENCE and adequacy. These terms, rather than 'translation', may therefore appear more appropriate for use in connection with advertising, where the QUALITY of the 'translated' text is usually assessed according to functionalist criteria (Bastin 2009, 7).

Transcreation and adaptation are also misused by many to define localization process. Transcreation is a creative translation act and focuses at target audiences' need and *skopos*. Transcreation *skopos* is defined by customer and its buyers. Transcreated text may consist of local usages, dialects idioms, and etc. However, considering these elements as a localization process would not be a correct example for localization term. Adaptation examples are also considered in localization but adaptation would consist of appropriation, domestication, imitation, rewriting and so on. Adaptation is defined by Routledge Encyclopedia of Translation Studies as:

> Adaptation may be understood as a set of translative interventions which result in a text that is not generally accepted as a translation but is nevertheless recognized as representing a source text (Bastin 2009, 3).

Transcreation and adaptation would be considered as a creative translation approach. These definitions and scholars' approaches clearly highlight how localization differs from translation by being generic process for translation, project management, DTP, and etc. Localization covers all these steps therefore translation is not equal to localization.

The examples I represent in sixth, seventh and eighth chapters would be a clear example for how translation and localization differs, which steps should be implemented

to localization workflow to eliminate localization issues, and what best practices are for a flawless localization.

3. LOCALIZATION TOOLS

3.1. CAT Tools vs. Localization Tools

Computer Aided Translation Tools and Localization Tools have specifications in common and unique differences, too. In common, they are built for helping translators, translation and localization companies, and direct clients who need translation and localization services. Whoever uses these tools would benefit from translation memory matches, terminology consistencies, previously translated segments or strings, and many other specifications.

Localization tools are built with visual reference (WYSIWYG: What you see is what you get) specification and this is the most unique difference between localization tools and CAT tools. There are some other differences between these two: project automation, specific quality metrics control, flagging strings for testing, bitmap editor for icons, special format support (ipa, xml, apk and etc.), pseudo translation, segment length checker (Some CAT tools have this specification, too), and many more built-in specifications.

As technology has developed, cloud localization tools become common in translation and localization industry. Computer based (installation required for each PC) localization tools have been used since 1998 and cloud based localization tools have been used for last four years. In game, web, and mobile application localization, both localization tools can provide localization solutions to commissioners, customers, companies and linguists.

3.2. PC Based Localization Tools

GILT's effect in translation and localization industry has been more visible in the millennium (2000) era with the advancements in translation and localization technology and internet speed. Also, international companies discover that they need more powerful tools for software, games, and applications for a smooth and issue-free localization process. This discovery let translation technology developers design new tools for localization projects for international companies delivering their products worldwide.

A UK company SDL has many tools for translation and localization processes and SDL Passolo is one of the most well-known and used localization tool in translation and localization industry. Passolo was first built for a medical localization project by PASS

Engineering GmbH in 1998 and in 2007, SDL acquired PASS Engineering GmbH and Passolo rights. SDL Passolo has three editions: Team, Professional, and Translator Edition. An Ireland company Alchemy Software Development also built a software localization tool and this tool named as Alchemy Catalyst. Alchemy Catalyst has Translator/Pro Edition, Localizer Edition, and Developer/Pro Edition. These editions present different features for translators and developers. These two localization tools have common features specially designed for localization professionals. Both tool have a WYSIWYG screen and layout which eases to understand context of the string, the function of text and other hidden dynamics in translation process. These tools render codes and deliver just translatable words to translators and editors. As these tools are generally used in software, game, and mobile application localization projects, the codes of these platforms have to be hidden from translators and editors. Both tool also grant access to edit button preface of a software, menus of a mobile application and pop-up messages of a website without breaking any codes of original format (Java, C++ or PHP).

SDL Passolo and Alchemy Catalyst supports more than 20 file types (Microsoft Visual Studio Formats, Mobile Computing Platforms, Java Platforms, JSON, HTML, PHP, ASP, JSP, XHTML, XML and more) and they may be one of the most popular localization tools in the localization industry. They also have embedded quality assurance modules so translators do not need to use an external tool to run quality assurance check on the files translated in these tools. To deepen these common features, I would like to explain some of SDL Passolo's and Alchemy Catalyst key features via screenshots taken from their official websites:

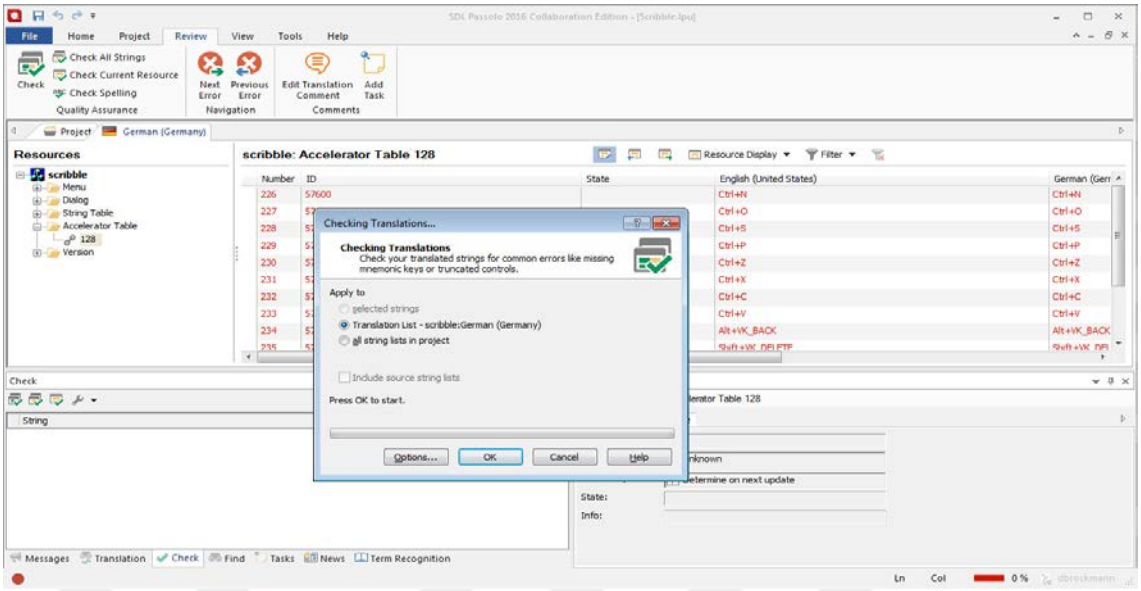

Figure 1. SDL Passolo Editor Screen

Source: *https://www.sdl.com/software-and-services/translation-software/software-localization/sdl-passolo/* Accessed March 03, 2019

SDL Passolo's editor screen is divided for different features like filters, source and target strings, preview screen and quality assurance tab. These features help translators to handle a localization project in one screen and to check any contextual and visual detail before delivery. On the top bar, there are other filters and features related to project, review, view, tools and help options. On SDL Passolo's editor screen, translator can check segment length and see contextual info about the string.

Figure 2. Alchemy Catalyst Mobile Application Localization Feature

Source: *http://www.alchemysoftware.com/solutions/mobile_devices.html* Accessed March 03, 2019

Alchemy Catalyst's mobile application preview and localization feature is shown in Figure 2 and this feature would be critical for understanding the context of a string and locating where this string is used. In the Figure 3, SDL Passolo's graphical user interface localization feature is shown. This feature can be used for any software, mobile application, website and many more localization processes. A translator can observe critical dimensions of localization such as context, text type (verb, noun or exclamation) and string length by character.

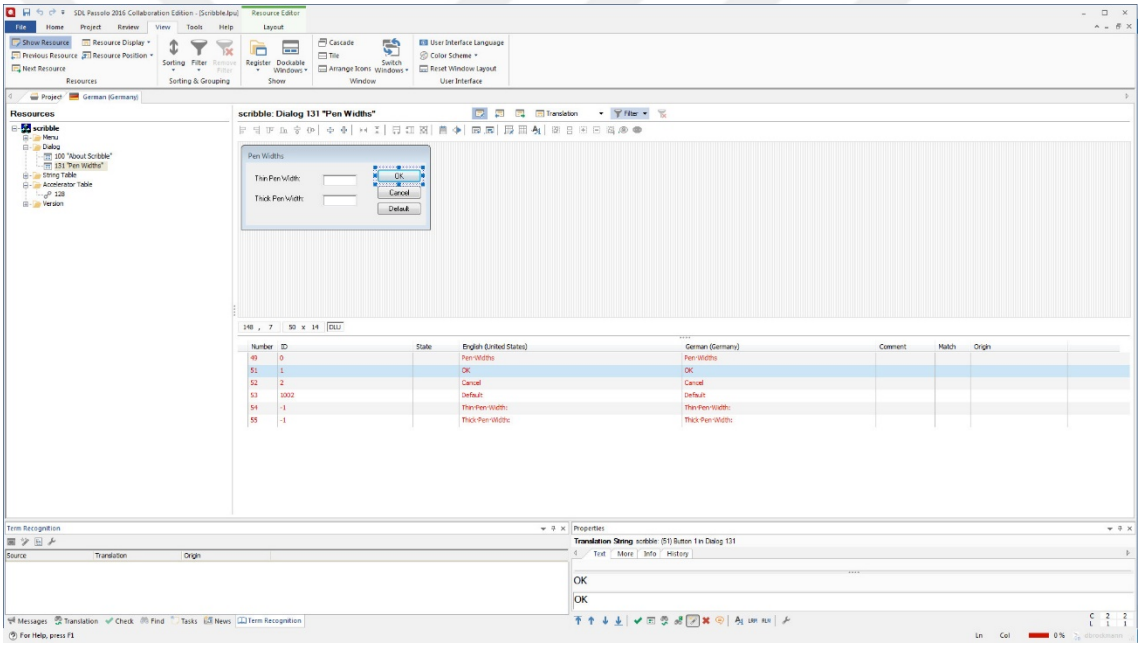

Figure 3. SDL Passolo Button Localization Feature

Source: *https://www.sdl.com/software-and-services/translation-software/software-localization/sdl-passolo/* Accessed March 03, 2019

This feature plays a critical role in successful localization process. I would like to deepen this context case with a simple example to understand what the difference between a CAT and Localization Tool is.

"Save" may be one of the first verbs we learn when we encounter with English. Such a simple verb can be tricky for a translator depending on the context and the text type. If translator sees this verb alone in a segment, any Turkish translator may firstly

write “Kaydet” in the target text section. However, if we use a localization tool and we see this is a button for a banking system and “Save” means “Make a Save” and when users hit that button, the bank account send change money to your saving account. So, in this context, “Save” means “Biriktir”. What if you are playing an online penalty saving game? If there is a “Save” button, what will be the Turkish equivalent for this string, “Kaydet”? It should be “Kurtar” if this is a soccer game and you are trying to control a goalkeeper in a penalty kick. Translators are blind without context and text types in localization projects.

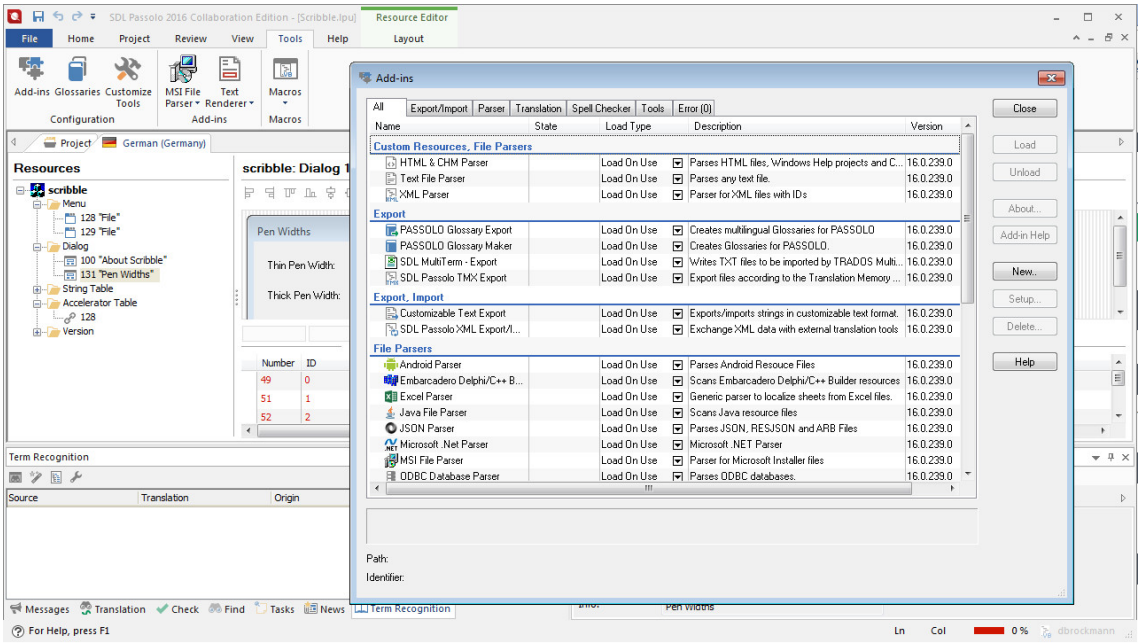

Figure 4. SDL Passolo Supported File Formats **Source:** *https://www.sdl.com/software-and-services/translation-software/software-localization/sdl-passolo/* Accessed March 03, 2019.

In translation and localization industry, there are some other tools used in localization projects. These PC-based localization tools are Sisulizer, RC-WinTrans, and Multilizer. Comparing to SDL Passolo and Alchemy Catalyst, these tools may be rarely used in translation and localization industry.

3.3. Cloud Based Localization Tools

Internet brings new technologies and developments to translation and localization industry like cloud-based translation and localization tools. Internet-based developments also affect how the localization industry works, collaborates, and delivers their services

to their customers. Cloud-based localization tools open an era by bringing collaboration-based localization feature to the industry. PC-based tools work standalone and need one license for one computer. However, cloud-based tools are username and password based thus anyone can log in anywhere at any PC. In a cloud-based localization tool project, many translators can work together in the same language pair and project managers can observe all processes in any language localized.

Today, cloud-based localization tools are used for mobile game, application, and website localization projects. Collaboration feature, low license cost (some of them are free) and no installation requirement for every PC make these tools popular in game, website and mobile application industries.

In mobile game and application localization, cloud-based localization tools can be listed as Applingua, Lokalise, OneSky, PhraseApp, POEditor, Smartling, Transifex, Tethras and etc. For website localization, these localization tools can translate HTML, PHP and ASP files but cannot host and localize via web proxy, except Smartling. Easyling, Localizer and Ulatus which are another web proxy solution provider.

Some of these cloud-based localization tools offer translator and editor community to their customers so that end clients can benefit from these freelancers in their localization projects. Small and medium enterprises, application developers or students can localize their applications, games or websites with freelancers registered to these localization tools for specific languages. Project managers or customers can track the progress and cost for every language localized. Like PC-based localization tools, translation memory, terminology and reference materials can be shared with translators and editors. Most of these cloud-based localization tools have embedded quality assurance module to check spelling, typo and other linguistic issues.

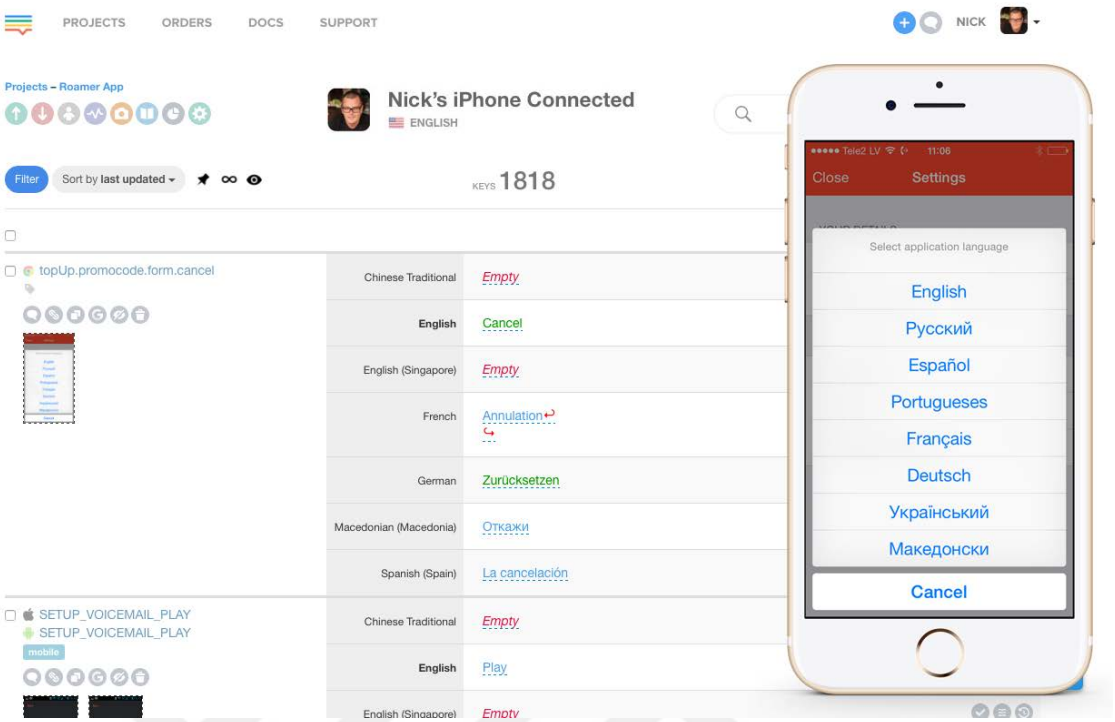

Figure 5. Localise Editor Screen **Source:** *https://lokalise.co/features* Accessed March 05, 2019.

Cloud based localization tools have common features like reference screenshots, hidden string values (like image name, link or etc.), compatibility with iOS and Android applications, web coding languages (HTML, ASP, PHP and etc.) and mobile game coding languages (Json, Java and etc.), and definitely collaborative translation editor environment. The collaborative working environment eases multilingual projects assignment and control process by providing QA and real-time segment or string checking modules.

Cloud based localization tools can visualize mobile applications, and web sites so translators and editors can see the context and how the translated strings look like when the product localized. Thanks to this feature, testing phrase may be shorter and easier than classic methods (Localizing strings, deploying the product, receiving feedback about translation and sending these feedbacks to testing team and deploying the product again).

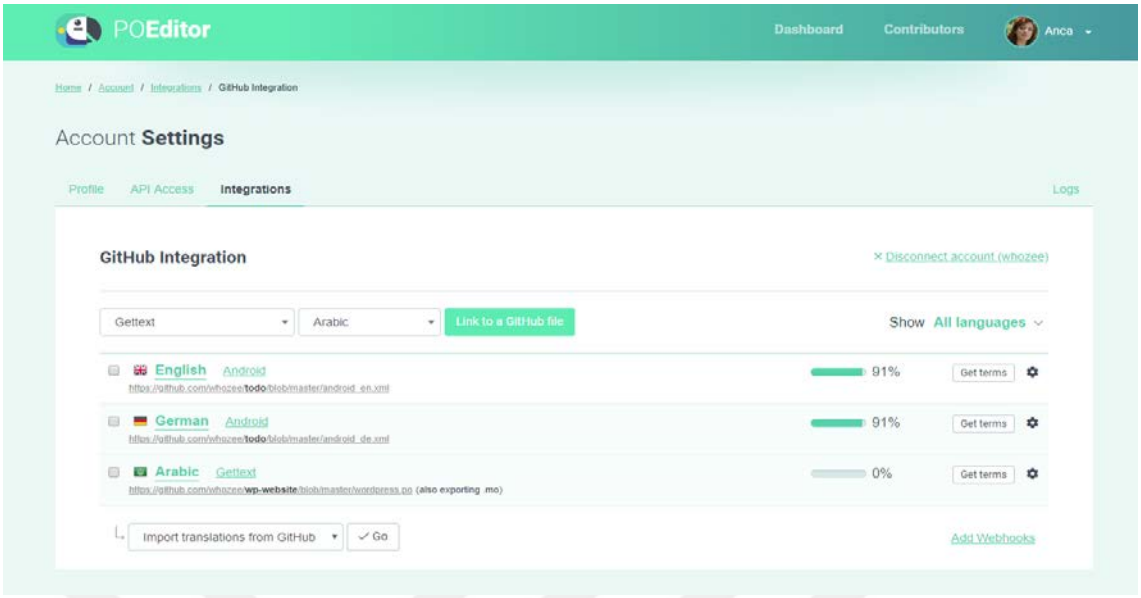

Figure 6. POEditor Project Screen **Source:** *https://blog.poeditor.com/page/1/* Accessed March 05, 2019

Integrations with iTunes, Google Play, GitHub, Slack, JIRA, Sketch, and other developer platforms help developers to localize their content with cloud-based localization tools without downloading or migrating files to anywhere. The integration eases manual localization process and provide an agile localization process to the developers.

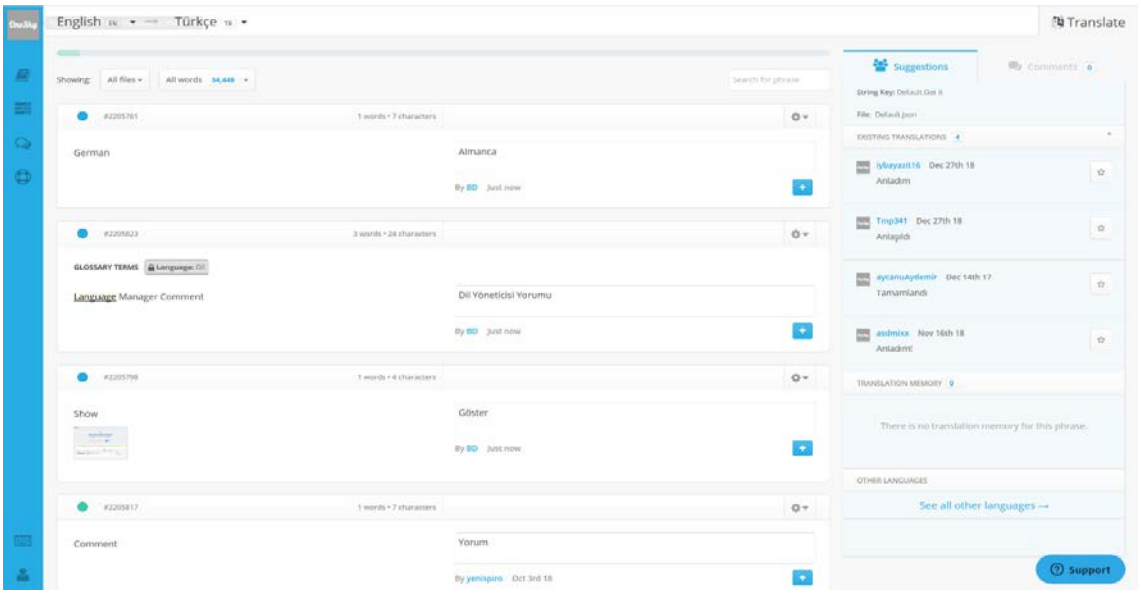

Figure 7. OneSky Editor Screen **Source:**

https://translate.oneskyapp.com/collaboration/translate/project/project/3/language/14#/

Accessed March 05, 2019

In summary, cloud-based localization tools provide agile localization to mobile app and game developers, website builders, freelance translators and editor, and companies. Collaborative cloud translation environment, mobile application and game visual editor, built-in quality assurance module, and compatibility with special file formats for mobile applications and games are prominent features compared to pc-based localization tools.

4. GLOBAL GILT MARKET

VIDEO GAME, WEBSITE and MOBILE APPLICATION MARKET

Internet has impacted many businesses like video games, websites and mobile applications and this impact has profoundly affected services and effectiveness of these businesses. In 90's, websites had basic functions compared to today's websites and web utilities. Video games were designed in 2-bit and 1D (One dimension) platforms, and mobile applications hadn't been imagined yet.

The natural development chain of computer systems can be specified as: 1- Software and hardware developments in computers, 2- Worldwide accessibility of the Internet, 3- Developments in programming languages and 4- Further speed and quality enhancements in all these developments. This continuous development process produces new technologies and products like: realistic games, multi-functional websites and today's mobile applications.

In 90's, websites were designed in HTML coding language and they had limited and basic functions like: searching, adding image, adding hyperlink and etc. Today, websites are built by ASP, PHP, JAVA, HTML5 and many more coding languages and they can even become a robot talking to a visitor, guiding the visitor to a page, or they can be your bank where you can send and withdraw money or create a new virtual credit card. Companies can make revenue, showcase and hire their TV series, sell any product globally via their online sales platforms thanks to new generation websites.

In 70's, Ping-Pong[8] was the first video game released and then video games were first designed for consoles like Nintendo Atari 2600 in 1977 and reached 27,640,000 sales in one year. This success story of video games was followed by Pac-Man in 80's, Mario Bros in 1981 and many simple games designed 2-Bit and 1D platforms. In 90's, enhancements in game industry created a rivalry between game console designers like Nintendo, Sony and Microsoft. This rivalry ended with better consoles like Gameboy (A portable game console), Sony PlayStation and new successful games Mortal Combat, WarCraft and etc. The new era was just not affect consoles; PCs were also a game portal for gamers. This led game developers to create two versions for the same game; one for

[8] https://www.forbes.com/sites/hnewman/2017/11/29/the-history-of-video-games-in-one-infographic/ Accessed September 14, 2019.

PC and one for console. Today, games are in our mobile phones, game consoles, PCs and on internet.

Mobile applications are new to the global market compared to video games and websites. History of mobile applications dates back to 1994, built-in calculator, calendar and other simple applications like address book. In 2000's Blackberry's e-mail application and iPhone's built-in new generation applications change the classic way of mobile applications. Colorful, 3D, touch controlled mobile applications became daily assistants of people. The latest mobile phones are actually smart and compact computers and now, people do not depend on their computers like 2000's. They can do almost every action with their smart phones. As a result, people spend their time with mobile applications more than video games and websites; they use social media for liking, posting pictures, reading news, checking in their flights, paying bills and more.

Today, developers can make profit over 46 Billion USD[9] via mobile games. This revenue is split for development of a new product, updating an existing product, and annual costs of companies. This cycle can be sustained by the users and payers as long as developers and companies produce a new, unique, and addictive game or application.

[9] https://www.forbes.com/sites/hnewman/2017/11/29/the-history-of-video-games-in-one-infographic/ Accessed September 14, 2019.

5. GAME LOCALIZATION and TURKISH GILT ISSUES

History of games roots back to the first arcade game *Ping-Pong* released in 1972. This game is the ancestors of all Atari games, too. In 1977, Atari consoles were produced and 27,640,000 Ataris were sold globally. Game industry kept growing and in 1980s Mario game was released and 1990s Nintendo announced its new console: NES. These game consoles were television-based and new game consoles were on the way. Sony entered the game industry and launched PlayStation in 1995 and this console reached 104,250,000 sales globally.[10]

At millennium age, game industry starts conquering computers and consoles and every year the industry keeps growing as many people have personal computers, game consoles or portable game consoles like Gameboy compared to 1970s, 1980s and 1990s. In 2010, game production for PC increased; game consoles and smartphones and Internet are the power behind this increase. Internet's effect on game industry cannot be neglected as Internet helps game developers and producers to create online, simple and profitable games. Today, the industry has 2.2 billion gamers just in video games, and console and mobile game players are increasing day by day. Launching of Sony PlayStation 3 and PlayStation 4, and Microsoft Xbox affects game industry in depth as there are now more platforms to play the games and all these platforms have unique operation systems and mentality. For example, GTA V was designed and localized for PC, PlayStation and Xbox and even all these platforms have the same localization texts, the different control buttons and functions of these platforms affect localization and internationalization processes.

Although game platforms change according to the players' demand, growth of the revenue and game industry are still steady. Gamers may choose different platforms, but nowadays, some gamers play games on multiple platforms like PC, game console and smartphone. In 2017, preferences of playing games by gamers are as following: 27% on PC, 31% on game consoles, 42% on mobile platforms. As we see, mobile gaming dominates the industry's gamers and as a result, its revenue is 46.1 billion USD in 2017. Also, it is expected that mobile game industry will constitute half of the gaming industry by 2020.

[10] https://www.forbes.com/sites/hnewman/2017/11/29/the-history-of-video-games-in-one-infographic/ Accessed September 14, 2019.

In Turkey, there are 30 million gamers in PC, console and smartphone based games in 2019. The games played in Turkey are not always localized into Turkish and many of them are in English. However, many of these games are localized officially (by game studio and a Turkish localization team, i.e. Uncharted Series) or unofficially (by game fans, i.e. Grand Theft Auto 5). Both official and unofficial localizations contain errors in linguistic and visual aspects.

Turkish is an agglutinative language and its sentence structure is like Subject + Object + Verb however English's (the common game language) sentence structure is like Subject + Verb + Object. This language family based difference affects localization processes in linguistic, visual and contextual aspects. Simple words become harder, character numbers are truncated on game screens and internationalized standards (punctuation marks, decimal usage and etc.) disappear in properly localized games.

Contextual issues are generally caused by polysemous words, mistranslations and wrong word/adjective selection. Localization of simple polysemous words like "times" and "short" may end up with big mistranslation issues. In NBA Mobile 2017 game, the word "times" is used to clarify how many times a card series is completed. The translation string is: x Times. Here, x is a variable and can change if there is a new accomplishment in this series.

Figure 8. "Times" Issue **Source:** NBA Mobile 2017 – iPhone, Accessed January 03, 2018

As we can see in the screenshot, the times word is translated as “kat”, one of its first meanings. However, this one needs to be translated as “kez”, as it is more suitable than “kat”. It seems simple to handle such polysemous words but it is not that simple indeed. These words have to be checked both visually and contextually.

The word “short” is also a simple and sometimes problematic one in game localization. In a soccer game, short can be encountered as a part of a jersey and length of soccer pitch’s grass. In both cases, the short word is translated with one target word, translation issue is inevitable.

Figure 9. “Short” Issue **Source:** Pro Evolution Soccer 2015 – PlayStation 4 Accessed October 05, 2019

As seen in the example, Çimin Uzunluğu (Length of Grass) has some options and one of them is “Şort” (Short) but it has to be “Kısa” (Short). Contextually wrong translation leads a critical issue in game and this game sold over 1 million digital and CD copies.

Another example from NBA Live 2017 is about the “Home” and “Away” words. These words are almost the first ones we learn in English. Again, these simple words could cause a localization issue if they were misunderstood or the context was not properly observed. In a basketball game, “Home” and “Away” words would be treated as Home team and Away team, and it is not just limited to a basketball game, it is for all sports game. The context is clear and localization team knows what they translate as

localization text consists of many basketball terms. So, how did such a critical issue occur in localization?

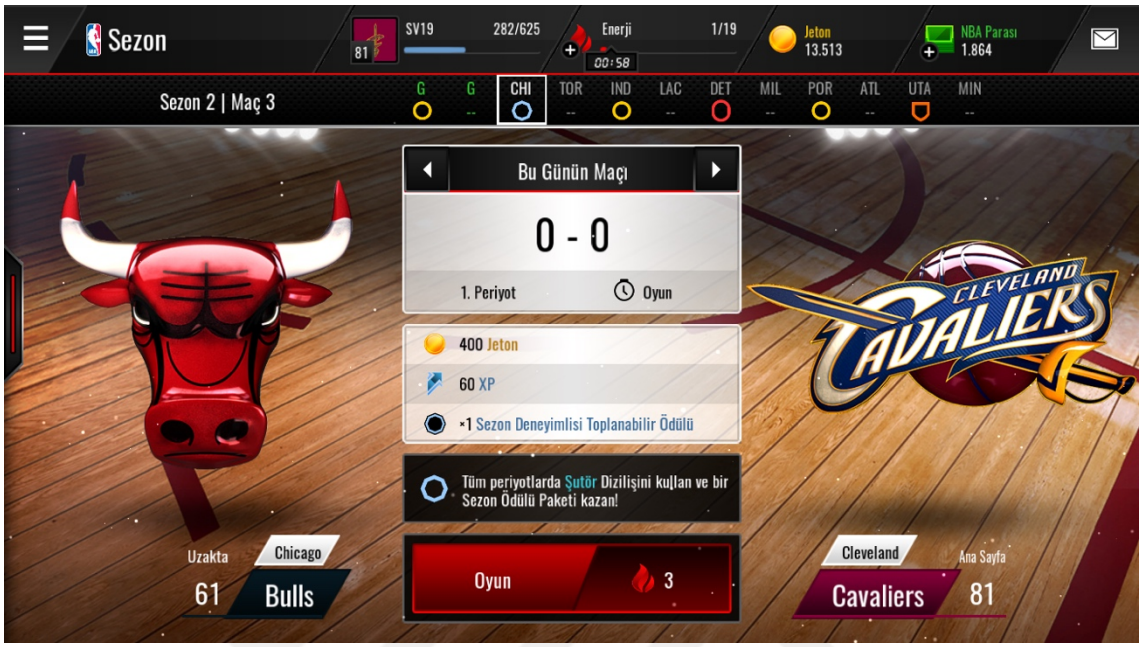

Figure 10. "Home & Away" Issue **Source:** NBA Live 2017 – iPhone, Accessed April 23, 2018

"Away" was translated as "Uzakta" and "Home" was translated as "Ana Sayfa" as necessary testing and controls were not done on the game. This and previous contextual issues can be solved as below:

1- The gaming company entered a single string for the "Short" word and set the game language file to match only one of the shorts. **Solution:** Contextual changes for such words can be overcome by entering different String IDs for both short words.

2- The translation company or translator may have written the first meaning of the word without checking the context of both words. **Solution:** By checking the previous and next segments of the word, we can easily understand the context and find the solution. If we check the word "Short" issue, the previous segment will most likely be "Çimin Uzunluğu" and the translation of Short word cannot be "Şort".

3- If localization process is handled with a CAT Tool, this tool will populate all repetitions once. For example, if a translator enters "Şort" or "Kısa" for "Short" word, all "Short" words in the text will be populated as the first entry

given for “Short”. **Solution:** If a CAT Tool is used in localization process, it is possible to disable repetition feature for a segment. So, if translator or editor detects the context problem, they could disable repetition feature and enter two different targets for Short.

Besides contextual issues, there are some other issues related to linguistic and internationalization processes. On linguistic aspect, prepositions and sentence structure cause lots of issues if linguistic competences of translator and/or editor are not enough. Compared to English, some Turkish prepositions are used as a suffix and these suffixes are formed by the last letter. For example, in this context the preposition “to” has four forms in Turkish: “-ye”, “-ya”, “-e” and -a. These four different forms can cause a localization problem, unless translator or editor take necessary precautions about their translation.

For example, in FIFA Mobile 2016 game two variables, one verb and the preposition” to” consist a sentence and the context is a soccer game. The sentence is “{1} passed to {2}”; {1} and {2} can be altered with any footballer so {1} can be Messi, Ronaldo, Greizmann or Sneijder. However, this sentence was translated into Turkish just for one example: “{1} topu {2}’ye aktarıyor”. In this example, it is obvious that translator or editor ignore the functionality of this text. The variable {2} has a preposition “to” and the preposition is translated as -ye.

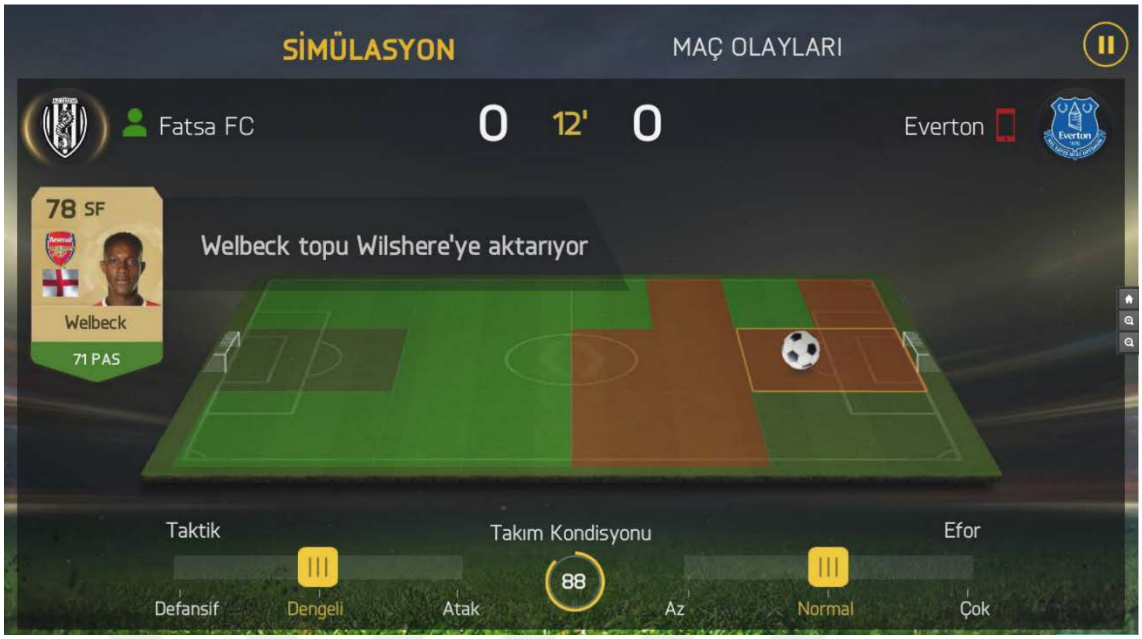

Figure 11. "Suffix" Issue **Source:** FIFA Mobile 2016 – iPhone 6, Accessed December 08, 2017

What if the {2} variable is equal to Ronaldo, Greizmann or Sneijder? This translation will be like "X topu Ronaldo'ye/ Greizmann'ye/ Sneijder'ye aktarıyor", which are wrong in Turkish. As seen in the example, that will cause a critical localization issue, as well.

As we cannot guess which footballer will be replaced by {2} variable, we cannot just write one possible translation for this preposition. But, how can we eliminate such errors? The answer is simple; by transcreation. If we take this example, the function is about one player passes to another. So, in Turkish we can translate this sentence with different solutions. If we change the voice of verb and make it reciprocal, we will not need the preposition "to" and our sentence can be translated as: "{1}, {2} ile paslaştı". Even {1} or {2} variables correspond to any footballer, there will not be any localization issues.

However, sometimes reciprocal usage is not enough to eliminate a localization issue. In a combat scene or war game, "{1} killed {2}" can easily be localized using the passive voice: "{2}, {1} tarafından öldürüldü" or "{2} öldü. Öldüren: {1}." There are

simple and easy shortcuts such as this in game localization and any untested game will most likely have these kinds of localization problems.[11]

Internationalization issues are also other frequently encountered ones in game localization. Turkish uses Latin alphabet and it belongs to Ural-Altaic language family and because of that it differs in grammatical rules, and unique letters like: Ç, ç, Ğ, ğ, İ, ı, Ö, ö, Ş, ş, Ü and ü. This letter difference may cause many localization problems like length restrictions, character corruption, text truncation and etc.

These characters Ç, ç, Ğ, ğ, İ, ı, Ö, ö, Ş, ş, Ü and ü sound uniquely Turkish. When the game internationalization process is underway, engineers must pay special attention to the consonants Ç, ç, Ğ, ğ, Ş, ş and vowels İ, ı, Ö, ö, Ü, ü. These letters may cause character corruption in a game which was not prepared with UTF-8 language code. In such case, "ı" may be displayed as "y" and other special Turkish characters may be displayed with a question mark. Using the correct language code for every language is vital for internationalization and localization.

Internationalization is not restricted to letters. Language specific punctuation marks are also mostly misused elements in game localization. Percentage sign, comma and full stop are always tested before the launch of the game. Here is a misused % example, in Turkish percentage sign is located on left but in English it is located on right. This example below is in Turkish but the percentage sign is on the right side of the number. This is an internationalization error and can be fixed by correct language coding and testing.

[11] Bekir Diri, "Turkish vs Game Localization" *MultiLingual*, September 2017: 44-47.

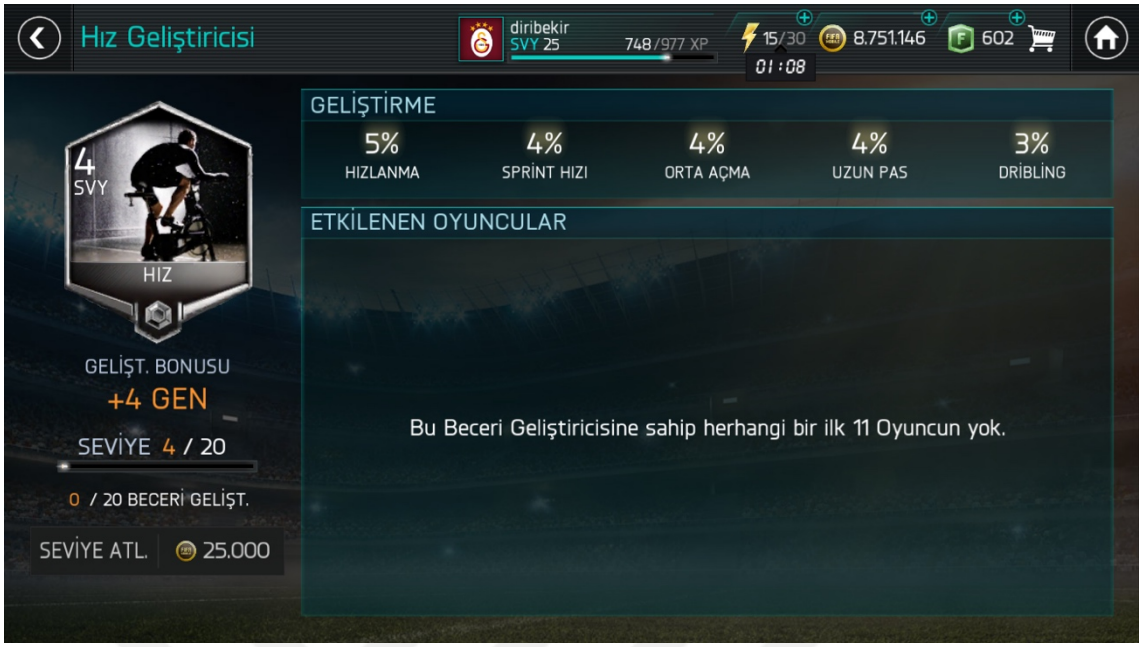

Figure 12. "Percentage" Issue **Source:** FIFA Mobile 2018 – iPhone 6, Accessed October 19, 2018

Percentage usage may differ in languages and percentage sign is located on the left of number without space in Turkish but in English, this sign is located on the right of number without space. Such linguistic differences should be in internationalization checklists of localization teams to prevent wrong usages in any platform.

Game industry is getting bigger day by day in Turkish market and this expansion will most probably bring more Turkish game into the game market. Mobile, PC, and console games will be released every year as a new game, update, or fix but Turkish will always be a main language for many games played by millions. As millions play Turkish games, Turkish localization need will rise accordingly. Turkish localization teams need to handle every game with care, away from localization and internationalization issues. But how?

Game localization has four main steps: culturalization, localization, LQA, and testing. When these steps are properly followed, such examples given above can be eliminated by localization teams. Game localization is not just translation and these four steps above have to be followed. Translation is a critical part of this process but alone, it will bring issues like given in this thesis. All these examples have a common part: they consist of translation but lack of testing and internationalization steps.

To eliminate game localization issues in Turkish, localization teams should first implement internationalization steps to games, then follow transcreation and culturalization procedures in translation step, and finally run testing on games to ensure such issues presented in this thesis will not happen in future. Frequently encountered internationalization, transcreation, and testing related game localization issues would be overcome via given solutions in this thesis, and be a guide for new games in many platforms.

6. WEBSITE LOCALIZATION and TURKISH GILT ISSUES

Thanks to technological improvements in computer and web science, there are more than 1 billion websites on the Internet now. Around 90s, first and legacy websites came to our lives and these were coded in simple HTML codes. New code languages (i.e. PhP, ASP and XML) were generated and so many new websites were published with their new interfaces and code builds. These developments both in web systems and code languages have brought a new player into scene; multilingual websites.

Multilingual websites have multi-functions and these functions have to be active in every language without any issue. Translation, localization, internationalization and globalization processes help these functions staying online and functioning properly. GILTed and tested websites would not have any linguistic issues as all possible problems have been eliminated by testing and visual control procedures.

Every language has its own dynamics so a multilingual website has to operate all these language dynamics for locals. If a British origin company wants to localize its website into Arabic, this website has to position its content from right to left as in Arabic. If it is still like a Latin language and its content is positioned from left to right, the locals cannot read it properly.

Miguel Ángel Jiménez-Crespo[12] mentions that web localization process varies depending on the nature of project, (marketing website, web- based application, e-commerce site, etc.), the technologies involved, the resources available or even the type of translation procedure (Jiménez-Crespo 2013, 29). From that point, he suggests to approach all web localization projects by their *skopos*, type, and technical background. This approach would prevent possible web localization issues exampled in this chapter.

Context related localization and transcreation are essential parts of website localization. Websites are marketing and sales showroom of companies, and they need to represent a company's mission and vision. So, they need to be flawless and well prepared for the audience and target markets in any language. Common issues encountered in website localization consist of literal translation examples and internationalization issues. I will examine internationalization and transcreation issues in Turkish websites and present solutions for these issues.

[12] Miguel Ángel Jiménez-Crespo. 2013. *Translation and Web Localization*, New York: Routledge.

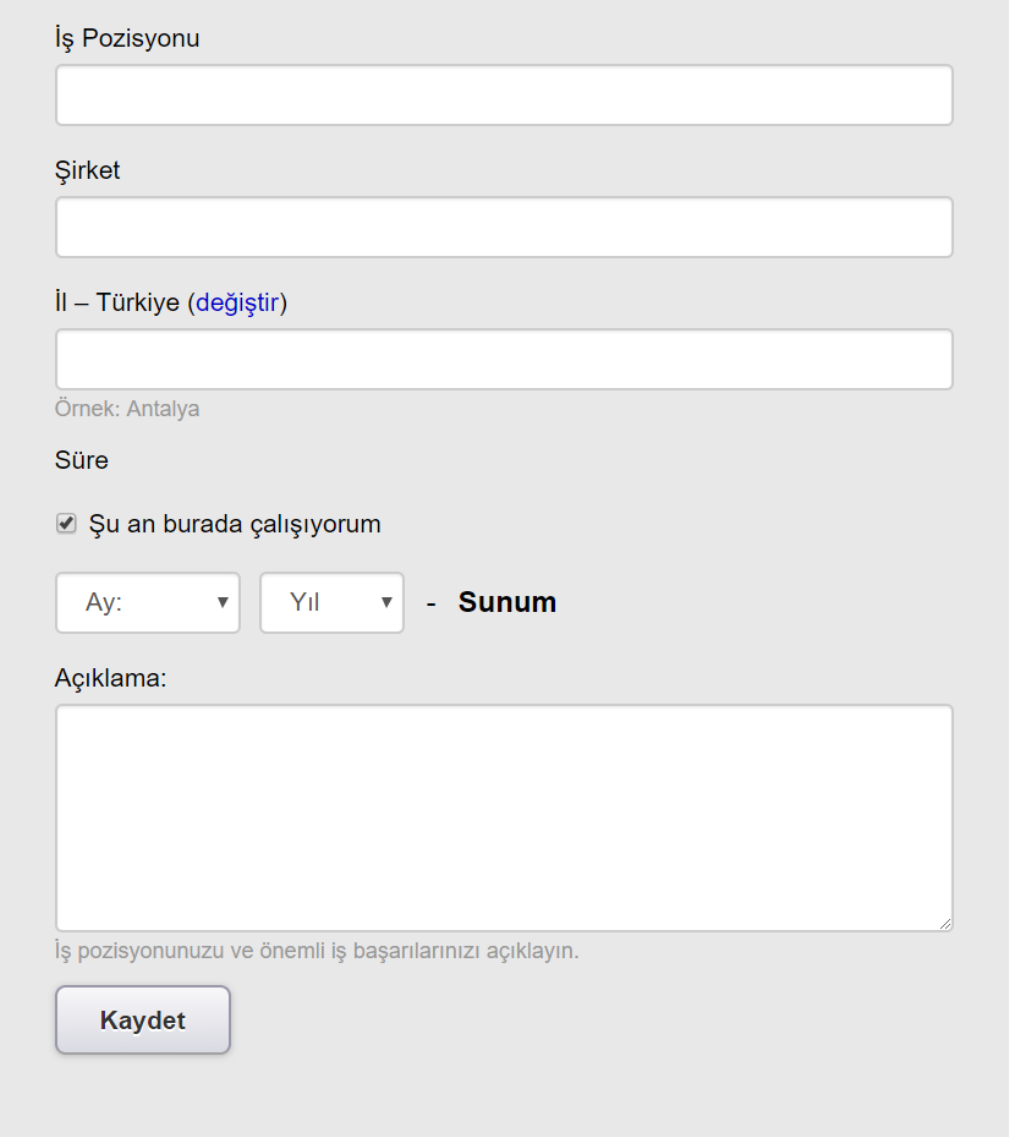

Figure 13. Literal translation issue **Source:** www.indeed.com/register, Accessed April 03, 2019

Word for word translation may become risky for a dynamic content like websites, web applications and more. Thus, simple words can be tricky for translators as they cannot see the context on grid view of CAT tools. On above, Turkish word Sunum is used for “Present” word which means: Today. However, in Turkish Sunum means presentation so this usage is totally wrong by context. The correct translation for present has to be Bugün. This simple translation solves the issue, but we have to understand the issue behind, in production (Translation, edit and proofreading) side.

Figure 14. Facebook WWF Türkiye Page Suggestion Suffix Issue **Source:** https://www.facebook.com, Accessed August 18, 2019

In agglutinative languages like Turkish, suffixes may cause linguistic issues in any part of a website. Facebook is a well-known social media platform and contains 100+ languages for its users. Facebook's Turkish page suggestion sentence is "{1}, {2} and {3} others liked {Page}" and Turkish translation of this sentence is "{1}, {2} ve {3} diğer kişi {Page}'i beğendi." The "to" preposition differs in Turkish as suffix is decided by the last two or three letters of the word. This decision will affect the to preposition in Turkish and it can form into four suffixes in Turkish. As there can be four suffixes for to preposition, one of these for suffixes will be correct in terms of translation. The solution for this issue is simple: transcreation. If translation team eliminates the to preposition in Turkish, there will not be a localization issue in any page name. For example, "{1}, {2}

ve {3} diğer kişi {Page} sayfasını beğendi" or "Page} sayfasını, {1}, {2} ve {3} diğer kişi beğendi" suggestions are grammatically correct, and sound normal to any Turkish Facebook user.

Localization does not just consist translation step: the example given above proves that testing and on-product checks are vital for localization projects. In website localization projects, all files can be received in many formats like .html, .php, .asp and etc. Moreover, new generation content management systems (i.e. WordPress, Joomla, Magento) can use connectors to transfer translatable files to online and offline CAT tools without any data loss. Proxy localization technologies can prevent occurrence of such simple issues as translator, editor and proofreader can see the full context, dynamic and non-dynamic text, and buttons on a website. This technology's nature can grant a continuous localization and testing environment for translators, editors, LSPs, and companies.

Figure 15. Spotify's Facebook Connection Page **Source:** https://accounts.spotify.com/tr/login?continue=https:%2F%2Fopen.spotify.com%2Fbrowse%2Ffeatured, Accessed August 06, 2019

Turkish has become one of the main localization languages for many company and then companies start localizing their websites, web applications into Turkish. This trend results with internationalization issues in many Turkish web services or web sites. Spotify is an online music service serving millions in many countries in many languages and Turkish is one of Spotify's languages. Spotify was first developed for mobile phones

and tablets then the company developed a web based PC edition for its users. In web based edition, Facebook connection feature grants users to connect Spotify via their Facebook accounts. In Spotify's Turkish interface of Facebook connection page, we encounter corrupted Turkish letters and this means internationalization processes haven't been applied to this web based service. The corrupted Turkish letters are "ğ" and "ı" and this issue proves that UTF-8 codes haven't been applied to this web service. A simple testing can detect this issue and be solved just add UTF-8 code given below to the web service:

```
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
<meta http-equiv="Content-Language" content="TR"/>
```
[13]

This two row code can eliminate corrupted Turkish characters in any HTML-based website. However, there is always an UTF-8 code for eliminating corrupted Turkish characters. Fortunately, CMS systems have already known Turkish then there is no character corruption in these systems. Nowadays, free CMS systems are used from personal blogs to corporate websites.

Internationalization issues are not restricted with character corruption: there may be not corrupted but problematic Turkish characters, too. Capital *İ* and *I* belong to Turkish alphabet but some web sites and services cannot show *İ* as there is an internationalization issue behind the scene. In CAT tools, a translator, editor can translate and edit a sentence, word, or phrase without any internationalization problem as these tools optimized for many languages; they can see the correct forms of their translation and editing in their languages. However, when the translation was transferred to the product, users can encounter with capital I instead of İ as the product is not prepared correctly for Turkish.

[13] Turkish UTF-8 Codes, Source: https://www.r10.net/php/488818-utf-8-turkce-karakter-sorunu.html, Accessed August 15, 2019.

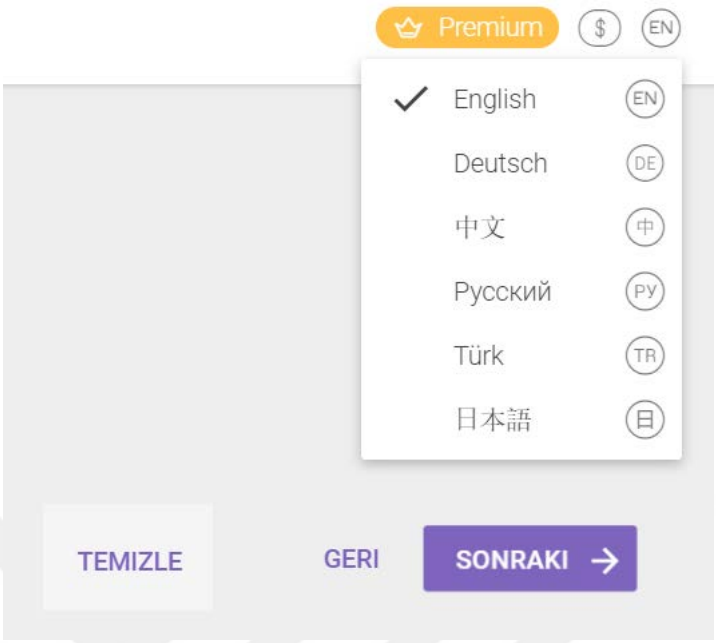

Figure 16. Internationalization and Context Issues in Smartcat **Source:** https://workspace.smartcat.ai, Accessed August 10, 2019

Smartcat is one of the latest online CAT tools in the market and contains six languages (English, German, Chinese, Russian, Turkish, and Japanese) for its users. These six languages are listed on top right of Smartcat's web service and one of the languages Türk is not a language but a name of nation. This critical issue is caused by synonym word in English: Turkish. Turkish means both Türk (Turkish nation) and Türkçe (Turkish language) and this issue proves that testing has not applied to Smartcat's interface. This contextual issue may be occurred because of CAT tool's TM populated segments. A TM always populates a segment with repetition, so if there is two Turkish in Smartcat's interface translation project, one is populated for both segments. To prevent this, risky segments can be selected as do not populate/repeat option in any CAT tool.

In Figure 16, Turkish words *TEMIZLE*, *GERI*, and *SONRAKI* are correctly translated but there is an issue with *İ* in interface. These words originally are *TEMİZLE*, *GERİ*, and *SONRAKİ* but in Smartcat interface *İ* is missing. The reason behind this again an internationalization issue; the capital *İ* belongs to Turkish alphabet and English doesn't have this vowel then system cannot generate this vowel as it was not implemented via UTF-8 codes. UTF-8 code implementation and Turkish character recognition will solve this issue.

Web sites and applications surrounds us and we will need them for long years as they ease our lives in many ways. Also, Turkish will be a main localization language for long years as it has a huge user and market for global companies. As long as the Turkish market grows, demand for Turkish web localization will grow simultaneously, too. This growth most probably affects translation and localization needs for Turkish.

In this thesis, the solutions I mention and explain may guide Turkish web localization teams in their localization journey. Eliminating given issues in web localization projects would be important for users and clients as they pay money for web services and websites to use it, benefit from its local language as they may not understand original product language, and do not want to use a wrong localized product. Given solutions highlight the importance of internationalization and testing practices on websites and web services. Without internationalization, testing and contextual localization, websites would have such issues presented in this thesis.

7. MOBILE APP LOCALIZATION and TURKISH GILT ISSUES

Around 2000's mobile phones have entered a new age; they have been transformed into mobile computers. These pocket computers are not limited to calling or texting a person on your phonebook. Apple, Blackberry, Samsung and many mobile phone companies started selling and promoting their new generation mobile, smart phones to the world. These new phones bring new technologies to our lives; touchscreens, mobile applications and games.

People can touch the screens of their smartphones and command their phone to find a restaurant, take a picture, call a friend via internet-based applications, and more. All these new technologies rise a new star: mobile application. Mobile application industry can be split into two: before Android and iOS, and after Android and iOS. Before Android and iOS, mobile applications embedded with simple functions but after Android and iOS, mobile applications evolved into a Swiss knife. First applications in before Android and iOS time are calculators, calendars, agendas and very famous Nokia's Snake game and etc. However, mobile applications of today can teach you how to play a guitar, to drive to home safely, and interestingly to check your pulse.

Johann Roturier explains mobile application localization with that chart below:

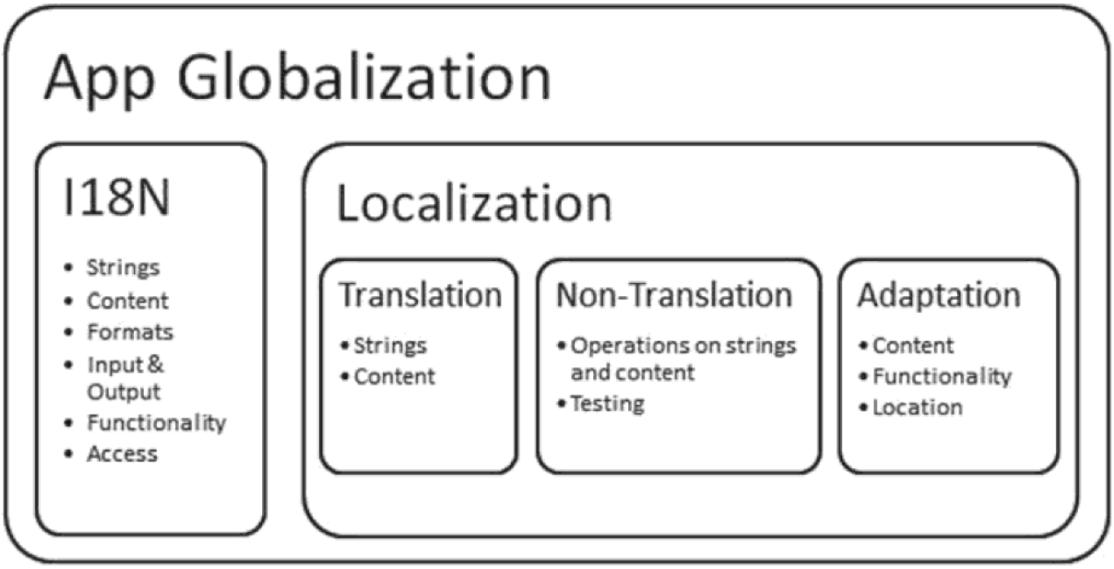

Figure 17. Johann Roturier's App Globalization Chart **Source:** *Localizing Apps: A Practical Guide for Translators and Translation Students.* Page 10.

Johann Roturier designs a mobile application globalization chart (See Figure 17) by listing I18n and L10n steps for an ideal localization workflow. In addition to these

I18n and L10n steps, he splits localization into three parts: Translation, Non-Translation, and Adaptation. I would like to mention about Non-Translation and Adaptation parts since these parts are needed for an issue-free localization workflows elements like; Testing, and Functionality. All issues I present at this section will be a clear example of missing these two steps in mobile application localization.

By nature, mobile applications need to be coded for iOS (iPhone OS), Android (Google OS) and other operation systems. These different platforms can reach different users and customers, and developers. In development process, an iOS designed and coded mobile application do not function in an Android device and vice versa. Thus, every mobile application company create the same application's iOS and Android versions to reach both markets and users.

Localization journey of these two OS is totally different; unique coding languages, folder structure, localization files, and button options (iOS has no buttons except Home button but Android has built-in visual buttons). That uniqueness brings new challenges for localization and internationalization teams. These teams need to design and structure a basis for all languages first, then apply this design to both iOS and Android versions of the mobile application. The structural and code-related differences pose many localization threads for translators and LSPs.

In Turkey, 46.4 million[14] people use smartphones and this value will be estimated to reach 56.4 million in 2023. All these smartphones may have minimum 10 applications and these applications have Turkish interfaces, buttons and menus for both iOS and Android operation systems. Localization and internationalization processes of common, frequently used mobile applications can be difficult and tricky for any LSP, and freelance translator. I will present some localization and internationalization issues and solutions for these processes.

Popular mobile applications like Instagram, Facebook and LinkedIn are widely used by millions around the world. In Turkey, adults spend at least 4 hours in a day in social media and 42.67% of general population[15] uses social media in their smart phones.

[14] https://www.statista.com/statistics/467181/forecast-of-smartphone-users-in-turkey. Accessed July 23, 2019.
[15] https://www.statista.com/statistics/567417/predicted-social-network-user-penetration-rate-in-turkey/. Accessed July 23, 2019.

Nearly half of the population uses social media and this also means they connect their accounts via their mobile phones applications or web browser. These mobile applications have Turkish interface and regular updates for a new feature, language, and bug fixes. Social media companies invest millions for translation and localization of their products to go global and attract more audience to their products.

Localized mobile applications reach to millions in every market the developer company enters. Turkish is one of the biggest markets for these mobile application developer companies. However, users are still encountering with simple localization issues in Turkish mobile applications. Common translation issues are related to ignoring of simple Turkish syntax structures, and testing of the products. I will present some simple and avoidable issues, and their solutions on popular social media mobile applications.

Figure 18. "Suffix" Issue **Source:** Facebook, Accessed April 25, 2019

Social media applications have many personal fields to share with our social media friends and followers. These fields can show users' birthday, marital status, education status and many more personal details. On Facebook, you can share your latest

activities like marriage, moving to a new city/country, a new school and etc. The example above presents a simple Turkish localization issue; localization of “to” suffix into Turkish. “To” suffix can be formed into “-e, -a, -ye, -ya” in Turkish. As this simple and independent “to” suffix can be used in Turkish with four forms, localization issues can be encountered so frequently in social media applications and web sites. In this example, Lisesi is the trickiest part for localization team. Because, this is word for word translation of high school and it is totally correct. However, high school string is translated as Lise in Turkish. That’s why the “-ye” suffix is used in every high school update in Turkish. Lisesi’ye is totally wrong but Lise’ye is totally right. Solution for such cases is simple; Testing.

Figure 19. “Suffix” Issue **Source:** Facebook, Accessed June 10, 2019

In this example, we encounter with two different “to” suffix issue in Turkish. The first one is used for university, and the latter one is used for Sinan. In the first one, again we encounter with a school degree; university. The simple form of university in Turkish is üniversite and the suffix “-de” can be used with that nominative case but not with the

objective case. The real problem for this and the previous examples are totally same and simple. In Turkish, school, high school and university names always end with a suffix and they do not be used with nominative cases. For example, Üsküdar Lisesi, İstanbul 29 Mayıs Üniversitesi, and more.

The second suffix issue is with the name and the suffix follows it. In Turkish, the name Sinan should be followed by "-a" suffix. The names Sinan, Nilüfer, Cansu, Ali should be followed four different suffixes in Turkish: -a, -e, -ye, -ya.

Figure 20. "Possessive Adjective" Issue **Source:** Facebook, Accessed June 15, 2019

Not only suffixes but also possessive adjectives can be problematic in Turkish localization journeys of mobile applications. The 's possessive is unique in English but it has eight forms in Turkish: 'in, 'ın, 'un, 'ün, 'nin, 'nın, 'nun, 'nün. Localization team may have decided on one possessive adjective for all Turkish names and this creates a global localization issue on Facebook mobile application's Turkish interface.

Both "to" suffix and "'s" possessive adjective localization issues can be solved in two simple and effective ways: AI (Artificial Intelligence) powered suffix, and possessive

adjective generator or transcreation. AI can be fed by Turkish patterns and in any case computer can select and place the right suffix or possessive adjective. AI may be the convenient solution to prevent such issues but it is hard to implement AI to the mobile application and very expensive to develop. The second one, transcreation, is a new industry term but has been used by many companies to promote their creative translation and localization services recently. Thanks to transcreation, such issues can be solved by an easier and a cheaper way compared to AI solutions.

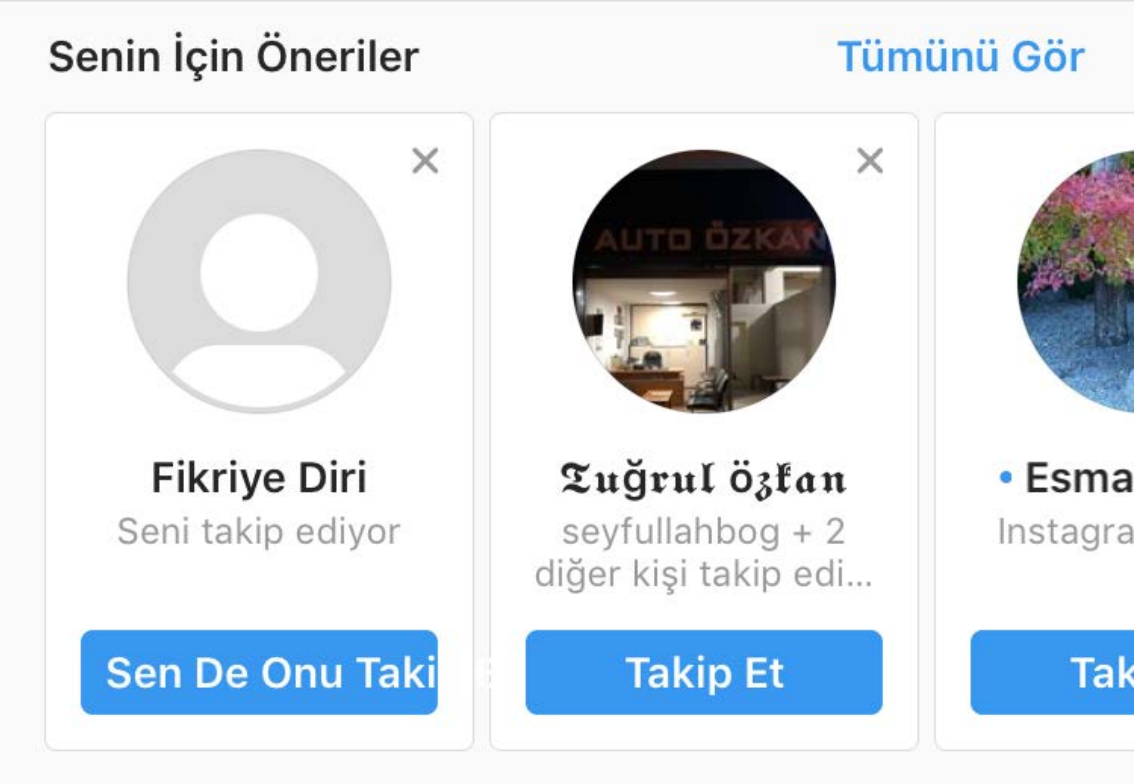

Figure 21. "Truncation" Issue **Source:** Instagram, Accessed July 01, 2019

Language length difference may also create mobile application internationalization issues. English string of a button may not fit to the Turkish string as the length of the translation is longer then allowed. In such cases, truncation may appear in the buttons as shown Figure 20. Follow Back button is localized into Turkish as Sen De Onu Takip Et but as we see this translation cannot fit the button. The button has 15 characters but the translation has 19 characters. Testing and transcreation, once again, become a solution for this issue. By testing, a tester can detect the issue and inform localization team to fix this. Localization team can fix this by two ways: transcreation, and code change for this button.

By transcreation, this text can be localized as Sen De Takip Et so, just omitting Onu pronoun can make enough space for this button. By omitting Onu pronoun, the meaning will be same but slightly changed, diminished. However, this new translation can fit into the button now and will not be a critical localization issue anymore.

Developers can make changes in button codes but this process may be expensive and problematic for developer company. Moreover, if this developer company plan to publish their mobile application, the company would need more developer and money to afford such changes in the mobile application. Another way to eliminate this issue is reducing font size of the text if coding of the product allows this change.

Figure 22. "Internationalization" Issue **Source:** Uber, Accessed July 25, 2019

Turkish alphabet consists of Latin characters and unique Turkish characters: Ç, ç, Ğ, ğ, İ, ı, Ö, ö, Ş, ş, Ü and ü. Every letter is coded in computer environment with a special character encoding. Turkish belongs to Unicode Transformation Format 8-character encoding family. Latin letters have already coded in UTF character encoding and unique Turkish characters added later. Here are Turkish letters encoded in UTF-8:

```
      Ç     ç     Ğ     ğ     İ     ı     Ö     ö     Ş     ş     Ü     ü
Code: 00c7  00e7  011e  011f  0130  0131  00d6  00f6  015e  015f  00dc  00fc
UTF8: c3 87 c3 a7 c4 9e c4 9f c4 b0 c4 b1 c3 96 c3 b6 c5 9e c5 9f c3 9c c3 bc
```

Figure 23. Turkish UTF-8 codes **Source:** https://stackoverflow.com/questions/14680059/how-to-define-declare-utf-8-code-points-for-turkish-special-chars-non-ascii-to, Accessed July 26, 2019

Without UTF-8, unique Turkish characters will not be properly shown as in Figure 22. Translation of this text is correct but internationalization steps were skipped as we can see *ŞIMDI DEĞIL* is not correct considering Turkish letters. It has to be *ŞİMDİ DEĞİL* and interestingly just İ letter is wrong but unique Turkish letters like Ş and Ç are correctly placed. This shows that İ letter is recognized as I by UTF-8 language encoding and that's why users encounter with this internationalization issue. Solution for this issue is simply apply UTF-8 encoding characters to mobile applications codes.

Mobile applications are in our pockets and part of our lives and they may become more important for humankind and robots in future. Localization need for mobile applications will be always on the market and this need will spread with new languages. All new languages may be a new journey for localization team, developer company and mobile application users.

The examples given in this chapter prove that internationalization practices like UTF-8 implementation, button truncation fix, and transcreation practices like suffix and preposition related re-translation, and truncation related word omitting will help companies to have flawlessly localized mobile application. Eliminating the issues by given solutions would aid localization teams and companies in many ways. These examples and solutions would prove the importance of internationalization and testing in mobile application localization journey and how transcreation can make difference and help solving translation issues via creative translation.

CONCLUSION

The aim of this thesis was to present common Turkish localization and internationalization issues in websites, mobile applications, and video & mobile games. The reasons behind these issues were highlighted and a solution for all situations was suggested. Issues presented in this thesis were grouped into two; internationalization, and localization issues. These issues can be solved by following three main dynamics of localization workflow: internationalization, creative localization or transcreation, and testing.

In Chapter One, theoretical framework of this thesis was stated and *Skopos* theory's dynamics were observed in every issue mentioned in Chapter Six, Seven, and Eight. I also suggested solutions for these issues by focusing on *Skopos* theory's dynamics. Also, I explained how transcreation would make a positive effect on flawless localization.

In Chapter Two, I mentioned and explained translation industry definitions, the industry's history. Also, translation and localization comparison was made by citing scholars' theories. The difference between this two terms was explained by examples and solutions of localization issues.

In Chapter Three, localization tools and translation tools were compared by their interfaces, unique features, and aids to translators, editors, and localization team in localization workflow. The comparison shows that localization tools are one step forward from commonly used translation tools in translation industry. In localization tools, translation team can see context so this can prevent them to be mistaken by verb or noun, button or link, and other linguistic usages may cause issues in Turkish. Another aid of localization tools is separating segments as strings: this feature can prevent translation memory populated issues. Examples given this thesis prove that localization and internationalization issues would be prevented by localization tools.

In Chapter Four, GILT world and Internet's growth and their effect on translation and localization projects were explained. I gave information about how much money spent on web, game and mobile application localizations.

In Chapter Five, Six, and Seven, transcreation, internationalization and testing issues were examined in Turkish web, mobile application, and game localization

examples. These examples were categorized by their genre and examined by specific requirements of these genres as web, mobile application, and game products have different coding platform.

Transcreation issues in sixth, seventh and eighth chapters highlighted that creative translation would eliminate literal translation issues and sound better for native users and players in target language. With transcreation, websites, mobile applications, and games would have a *Skopos* oriented translation as the only aim is to have a readable and clear translation. Source text is rendered for target audience and localization needs would be demanded the optimum translation. By that way, localization issues would be escaped and issue-free product can be delivered to end-users.

Missing internationalization practices prove that a product without internationalization would end with issues in target locales and these issues would harm all investment made to the product. This thesis suggests that internationalization practices and implementations should be applied before localization process to eliminate future issues in any target language for the product. In given examples, it is clear to see how internationalization practices is vital for website, mobile application, and game localization to deliver correct letters in any alphabet, avoid truncation on buttons and more.

Internationalization and localization issues can be detected before releasing product to target markets and these issues can be fixed by localization teams. At that point, testing plays a critical role for checking translated text on product and fixing detected issues, correcting translation memory for next update, and finally deliver an issue-free localized product to end-users. By testing, contextual translation issues, truncated buttons, incorrect suffixes for a Turkish name can be fixed. Thus, testing is necessary eliminating for both localization and internationalization issues.

In conclusion, eliminating Turkish localization issues via internationalization, transcreation, and testing is one of the main targets of this thesis and solutions given in this thesis would serve and help any translator or LSP translating any language into Turkish. I hope, this thesis helps eliminating and solving the mentioned Turkish localization issues in web, mobile app and game localization projects of Turkish localization teams.

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