# Background Research

In this chapter the background research done for this project is discussed. It elaborates the reason behind the idea for developing the Language Dependent Messaging App. It starts by first discussing about smartphones, its technological advancements, the percentage of people using smartphones globally and about how it has changed the mode of communication most used and preferred by people from all backgrounds in the section called *Smartphone users and their preferred mode of communication*. It then leads on to another section called *Multilingualism*. This section discusses about what multilingualism means, the percentage of people who are multilingual in present world, its main reasons and finally about the psychology of language, also known as the psycholinguistics. The next section called *Language Barrier* talks about the most common problem faced by immigrants in any part of the world and why it is very important today. The final section, *Technologies developed to deal with Language Barrier* describes and critically reviews all the various software developed that help deal with Language Barrier.

## Smartphone users and their preferred mode of communication

Today, there are more than 3 billion smartphone users globally. The first smartphone invented was in 1994 by IBM called Simon Personal Communicator. It had features such as email, fax, touchscreen and a 1 hour of battery life. It only sold 50,000 copies and lasted for about 6 months in the market. The next smartphone to be released on the market was in 1996 by Nokia. They introduced Nokia 9000 Communicator. It included all the IBM Simon features and a more such a web browser. The design of this device is known as the Clamshell design where the display and a QWERTY keyboard attached by hinge. Then Ericsson released their first smartphone to the market in 1999 with Ericsson R380. It was the first mobile device with Symbian OS. The first smartphone to be adopted in majority was developed in Japan by NT DoCoMo in 1999. US population started using smartphones with Windows mobile and Blackberry phones. Blackberry was nicknamed as “CrackBerry” in 2006 for the addiction of US population with their phones. Apple started their first smartphone with iPhone 1 in 2007. It had a capacitive touchscreen with resolution higher than any smartphone at that time and also had multi touch which allowed users to zoom in and out pictures. Their operating system was designed to handle large applications such as web browsers. This led to the development of Android. It was based on a keyboard slide-out prototype device. The first Android smartphone was HTC Dream, launched in 2008. By 2010 most of the majority of the Android smartphones were touchscreens only.

Since the invention of smartphone, connectivity has shifted from 1G which was a basic wireless telecommunication technology to 4G LTE. Smartphones have made huge improvements in voice quality and can now support having phone calls without any interruption to internet. This feature was available after Voice Over LTE emerged. Smartphones can also support connectivity such as Wi-Fi, Bluetooth, GPS etc. A smartphone’s screen resolution started from monochrome LCD to Matrix LCD, TFT LCD, Super LCD, OLED, AMOLED, Super AMOLED, Super AMOLED Plus and Advanced HD. Moreover, as users are storing private information in their phone ranging from photos to bank details security in smartphones have improved from pin and password unlocking to fingerprint sensor and facial recognition. In terms of productivity, today smartphones can do almost everything a laptop can do, such as email, document editing, photo/video editing etc. Regarding cameras in smartphones, have had massive improvements from 0.11 megapixel to over 20 megapixels now. It can also provide Bokeh effect to pictures taken, something which was only available in professional cameras. Smartphone processor has improved up to 8 cores with 2 GHz clock speed and RAM up to 8 GB. With such powerful processors and advanced graphics, smartphones can now support highly complicated games.

As already mentioned above, the number of smartphone users around the world is more than 3 billion. These numbers are forecasted to go up to 3.81 billion by 2021. More than 1.5 billion smartphones were sold globally and smartphone penetration rate is higher than 70 in highly populated countries such as India and China. Smartphone ownership have not been equal across nations. Nations with advanced economies have more mobile phone users, particularly smartphones, than nations with emerging economies. The top 3 countries with highest smartphone penetration percentage are United Arab Emirates with 82.20%, Sweden with 74% and Switzerland with 73.50%.

With the rise in smartphone users, a shift in the preferred form of communication to texting is observed. In United States 68% of Americans younger than 30 and 47% from age 30-49 use mobile phones for texting (Newport, 2014). Similarly, in the United Kingdom (UK), text messaging has overtaken phone calls as the most common form of communication. 58% of UK adults use text messages at least once a day (Noah, 2012).

Among all numerous numbers of chat apps available the most common ones are (Kim, 2018):

* **WhatsApp**:

WhatsApp is the most used messaging app worldwide. It provides end to end encrypted secure message transmission, voice and video calling. It is used by more than 1.5 billion people.

* **Facebook Messenger**:

Facebook messenger app is used by about 1.3 billion users globally. It is Facebook’s native messaging app. It also provides message transmission, video calling and voice calling along with features that are specific to Facebook.

* **WeChat**:

WeChat dominates the chat app market in China. It is used by more than 1 billion users. In addition to messaging it provides features such as social media and mobile payment.

## Multilingualism

Multilingualism is the ability to communicate in more than one language in contrast to monolingualism which is the ability to communicate in only one language. People who can speak two or more languages are called multilinguals or polyglots. Bilingualism is the ability to speak two languages. There are different types of bilingualism: compact bilingualism, coordinated bilingualism and subordinated bilingualism. Compact bilingualism is when a person learnt the 2 languages concurrently before sixth year. Coordinated bilingualism is when a person has learnt the second language before puberty and Subordinated bilingualism is when a person has a dominant first language and then uses it to learn the second language (Fabbro, 1999).

More than half the world’s population is multilingual (pdf CAL digest reference). A huge percentage of people in Asia and Africa are estimated to be multilingual or bilingual. In Europe more than 50% of the total population is multilingual. In Canada it is 35% and it is about 20% in North America (Grosjean, 2010). In countries such as India and Chine there are government policies that recognise more than one national languages. For example, in India the Eight Schedule of the Constitution of India has 22 languages and there are 99 languages that are not included in the Eight Schedule of the Constitution of India (Gulf News Asia, 2018). Most of the figures found regarding multilingualism and bilingualism are estimates as it is difficult to find the exact numbers. The reason behind the difficulty is because of the way the survey has been conducted. Sometimes the questions asked in the surveys might not be accurate or appropriate or properly reflect the population of the region where the survey was conducted.

The main cause of multilingualism is human migration from one place to another due to political, social, economic or religious reasons. For instance, students moving in to United Kingdom for education purpose. The total international student in the year 2017-18 was 468,385 with China and India among the top non-EU sending countries and Italy and France as the top most EU sending countries. In the year of 2017-18 Cardiff University had a total of 7,975 international students (UKCISA, 2019). When a person moves from a place where the main language is different to the place they move to, there arises a need to be able to communicate in the target language. For example, when a person moves from China to United Kingdom for Business, they would need to learn English to communicate as it is the official language in UK. Another reason for multilingualism can be territorial expansion. For example, even after Independence, British colonies such as India and African Union use English as one of the official languages among others.

As already mentioned, subordinate bilingualism is a type of bilingualism where the individuals have a dominant language, usually the mother tongue and use that language to learn a second language. Subordinate bilinguals think in their first language and then translate them to the second language before expressing them (Fabbro, 1999). This translation from one language to another leads to the occurrence of a cognitive load when the bilingual is involved in a conversation in the second language. As a result, it produces a delay in the responses by the bilingual.

## Language Barrier

Language Barrier is the inability to successfully communicate because of the lack of a common language. It is the main problem faced by immigrants and travellers. For example, when a person from USA goes to China, they face language barrier as they are not familiar with the local language of China. Similarly, when a student from countries such a Indonesia comes to United Kingdom to study, they face language barrier as English is not their first language.

There were an estimate 143.9 million arrivals in UK in the year 2018-2019 (GOV.UK, 2019). It is a 4% increase in the number of arrivals from the year 2017-2018. Among them a 9% increment in Visitor visa, 11% increment in work visa and a 9% increment in Student visa in the year 2018-19 was observed. Moreover, according to World Travel and Tourism Council the world Travel and Tourism sector grew by 3.9% in 2018, thus contributing $8.8 trillion to the global economy.

With the increasing tourism and immigration percentage, language barrier has become more and more dominant. It prevents individuals from having proper conversations and interactions, thus, tourists can sometimes miss out cultural experiences as a result. It also affects the learning growth of a student as they may not thoroughly understand the teacher and thus weaken the lesson absorbing capabilities. It can also prevent individuals from forming bonds as they might not able to clearly express themselves. These effects of languages barrier lead to frustrations among individuals as they might feel shameful and inadequate for not being able to understand the language and from not being able to express themselves.

## Technologies developed to help Language Barrier

*In addition to google translate and all talk about the speaking device in Nas Daily.*