

Effects of Culture on Web Design

A Comparative Analysis of Chinese and Western User Interfaces

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Sanni Savonen

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With over 989 million internet users, the Chinese internet is the world's largest online community, yet it is quite separate from the Western internet. This study aims to find measurable differences in web design between the Chinese and Western cultural groups by comparing Chinese and British websites.

The study is conducted by first reviewing existing literature on the subject, then forming hypotheses based on the findings from the literature. These seven hypotheses are then proven right or wrong by collecting data from 48 websites (24 British and 24 Chinese). The data is then further analysed to form general assumptions on the current state of Chinese and Western web design.

The formed hypotheses are related to typography, use of colours, movement, navigation, and length of webpages. Six of the seven hypotheses got confirmation, at least on the websites included in this study. This implies that the same could hold for a larger number of websites from Chinese and Western cultures. Some of these hypotheses could be explained easily with e.g. linguistic reasons, while others were related to deeper cultural differences. The key takeaway is that these differences should be considered in cross cultural design.

Keywords: Chinese web design, Cross-cultural design, Cultural usability, Web design guidelines, Cultural differences

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Kiinassa on yli 989 miljoonaa internetkäyttäjää, mikä on noin viidesosa kaikista maailman internetkäyttäjistä. Kiinalainen internet on kuitenkin hyvin erilainen länsimaiseen vastineeseensa verrattuna. Tämän tutkielman tavoitteena on löytää mitattavia eroja kiinalaisen ja länsimaisen nettisivujen suunnittelun välillä vertaamalla kiinalaisia ja brittiläisiä nettisivuja.

Tutkimusta varten käydään läpi olemassa olevaa kirjallisuutta aiheesta. Tämän taustatutkimuksen pohjalta muodostetaan hypoteesit. Nämä seitsemän hypoteesia osoitetaan oikeiksi tai vääriksi keräämällä aineistoa 48 nettisivulta (24 brittiläistä ja 24 kiinalaista). Aineistoa analysoidaan edelleen yleisluontoisten oletusten muodostamiseksi kiinalaisen ja länsimaalaisen nettisivusuunnittelun tämänhetkisestä tilasta.

Muodostetut hypoteesit koskevat typografiaa, värien käyttöä, liikettä, navigaatiota sekä sivun pituutta. Kuusi seitsemästä hypoteesista sai vahvistusta tähän tutkimukseen valikoitujen verkkosivujen pohjalta. Tästä on mahdollista vetää johtopäätös, että sama voi päteä myös muillekin verkkosivuille kyseisistä kulttuureista. Joidenkin hypoteesien tausta on helppo selittää esimerkiksi kielellisillä syillä, kun taas jotkin kumpuavat syvemmältä kulttuurista ja sen tavasta nähdä maailma. Tämä tutkimus osoittaa, että nämä todistetut erot tulisi huomioida kulttuurien välisessä suunnittelussa.

Asiasanat: Kiinalainen verkkomuotoilu, Kulttuurienvälinen suunnittelu, Kulttuurinen käytettävyys, Ohjeita verkkomuotoiluun, Kulttuuriset erot

Table of Contents

1.	Introduction.....	1
1.1	Research question.....	2
1.2	Thesis structure.....	4
2.	Background.....	5
2.1	Defining usability.....	5
2.2	Chinese design overview.....	8
2.3	Western design overview.....	11
2.4	Cultural models and theories.....	13
2.4.1	Hofstede’s cultural dimensions.....	13
2.4.2	Hall and Hall’s cultural model.....	16
2.4.3	Nisbett’s cognition theory.....	17
3.	Related works.....	19
3.1	Scientific works.....	19
3.2	Non-scientific articles.....	23
3.3	Discussion.....	23
4.	Methodology.....	25
4.1	Websites.....	25
4.2	The hypotheses.....	26
4.3	Data collection.....	28
5.	Results.....	29
5.1	Overall results.....	29
5.2	Typography.....	31
5.3	Colours and movement.....	36
5.4	Layout.....	37
6.	Analysis.....	42

6.1	Typography.....	42
6.2	Colours and movement.....	45
6.3	Layout.....	48
7.	Discussion	50
7.1	Implications	50
7.2	Limitations.....	51
7.3	Future research recommendations	52
8.	Conclusion	54
	References	56
	Appendix A: The data collected from British websites	i
	Appendix B: The data collected from Chinese websites	ii
	Appendix C: Fonts used on British websites	iii
	Appendix D: Fonts used on Chinese websites	iv

1. Introduction

It is apparent that there are differences in website design styles between the Western cultures and the Chinese culture. There are many non-scientific articles and guidelines regarding how exactly these design styles differ, yet they often have little proof. Scientific, peer-reviewed works do exist, but they often base their claims on designs created for the purpose of the study instead of existing websites. This research aims to find examples on how the current states of Chinese and Western web design differ through a comparative analysis of popular websites from both cultures. This chapter will provide an introduction to this study by first explaining the context, followed by the research problem, the research aims and the significance. Finally, the structural outline for this thesis will be presented.

At the end of 2020, about 989 million Chinese people had access to internet (Thomala, 2021). Around the same time in January 2021, it was also reported that the number of active internet users worldwide was 4.66 billion (Johnson, 2021). This means that around a fifth of all internet users are Chinese, which makes them a major subgroup and the largest online community (Thomala, 2021). However, due to the language barrier and the isolated nature of the Chinese internet, internet in China has grown to be separate and also distinctly different from its Western counterpart.

The motivation for this work is the desire to understand the key differences between Chinese and Western web design. When a Western user ends up on a Chinese website, it is obvious that the mindset behind the design is different. However, articles around the internet often list a lot of design differences with little proof that they are in fact common, sometimes even contradicting each other, and offering inconsistent explanations for the reasons behind these differences. Understanding these differences better can lead to improved cross-cultural design, an important factor in today's globalised world.

1.1 Research question

There have been previous studies on the differences between East-Asian and Western web design preferences. However, these studies often use hypothetical example websites created for the purpose of the study (e.g. Reinecke and Bernstein, 2013). When using real websites, comparisons are often made with only few samples (e.g. Al-Khalifa and Garcia, 2014; Hsieh 2014). Also, when research is conducted through interviews or other methods using human participants, the research participants are often international students (Clemmensen and Roese, 2010). It needs to be remembered that what they list as ideal qualities for a website might not be an accurate representation of the general population. Moreover, it is also important to research the existing websites to understand the current state of web design in a culture, not just list hypothetical preferences, as good design should always build on the existing conventions and what the users are used to and expect from a website.

This study aims to identify differences between Western and Chinese user interface design. The reasons behind those differences are then analysed to gain a broader understanding of the user experience (UX) and user interface (UI) field in China compared to that in the Western world. The Western culture consists of a large number of different European, American and Australasian cultures. The term “Western” does not have an absolute definition, but it is often considered to include Europe and other regions whose populations have had a large presence of European ethnic groups. However, as the Western world consists of a huge number of nations, it is necessary to choose one to represent Western design in this study. So, for the sake of facilitating comparison and having consistent results, the UK is chosen to represent Western design. “The UK” or “British” and “West” or “Western” are thus to be considered to mean the same thing in the context of this study. The word “Chinese” is also not completely unambiguous. In this study, the analysed websites represent mainland China.

Even though it is easy to think that because the internet is theoretically global, good and bad web design would also have universal definitions. Yet, as with many things, web design and layout preferences differ between every individual. It can be assumed, though, that a person’s cultural background affects their preferences and thus, it makes sense to

design in a certain way for certain groups. Grouping can be done according to many factors such as age, gender, profession and interests, but this study focuses solely on grouping by culture.

The research questions addressed by this thesis are

(RQ1) How does Chinese web design differ from Western web design?

(RQ2) Why do these differences exist?

To answer these questions this study examines 48 existing popular websites from different genres to form an overview of some of the differences between websites from the Western and Chinese cultures.

The study is conducted by first performing a literature review on the subject to form an overview on what qualities are typically thought to be prominent in Chinese design. Non-scientific articles (i.e. not peer-reviewed) are also included in this, as they also offer great insight on people's general thoughts. Then, based on these findings, seven hypotheses are established. The hypotheses address five different aspects of web design: typography, use of colours, movement, navigation and length of webpages. Research data is then collected from 48 websites (24 from the UK and 24 from China), and the results are then analysed to form general observations on the differences between Chinese and Western web design.

This topic is important to study, because the Chinese represent such a large part of the internet users and cultures worldwide are now in closer contact with each other than ever before due to globalisation, yet Western design guidelines seldom take other cultural backgrounds into consideration. Even though it cannot be said that all websites should try to please every user that might end up there, it is important to be aware of different styles of designing and viewing user interfaces. It is also important for many companies working internationally to be able to localise their websites properly to succeed in a foreign market such as China. Localisation is not just about translating the language, but also considering what kind of user experiences the target audience is used to. Therefore, vast knowledge of the target culture is needed to succeed in most cases.

1.2 Thesis structure

In Chapter 2, we begin with introducing the background theories, models, and terms relevant to this study. This is followed by a literature review in Chapter 3, where we summarise findings from previous academic works and non-academic articles related to design differences between Chinese and Western cultures. Chapter 4 focuses on explaining the methodology for the empirical study. The resulting data from the empirical study is presented in Chapter 5, and this data is analysed in Chapter 6, which explores the reasons behind the results. In chapter 7, we discuss the implications of the results, acknowledge the limitations of the study, and suggest future recommendations. Finally, the concluding remarks appear in Chapter 8.

2. Background

To understand the differences in web design between cultures fully, it is important to be aware of the context and background of those cultures and their design field. This chapter introduces some key terminology, concepts and theories that are relevant to understand when reading this thesis. The purpose in this chapter is to introduce the reader to the current status of the field in general.

This chapter begins with a definition for the term ‘usability’ as it is important to understand how cultural differences exist even in the definitions of terms used in research. As usability is an integral part of all web design, it is important to see how it might have different tones depending on the cultural context.

After that, the focus will be on the Chinese design and providing an overview on its features. This is important because the context in which the Chinese internet has developed is different compared to the Western world, which further supports the need to research the design differences between these cultural groups. Since Chinese design is compared with Western design, an overview of the Western design is also provided. Here, the main point is the Western love for clear, single purpose functionality. A big difference that also has to be considered is the popularity of mobile internet use in China which has led to many websites being designed mobile-first or even mobile only.

To round up this chapter cultural models and theories are introduced, of which the focus is specially on Hofstede’s cultural dimensions, cultural models by Hall and Hall, and Nisbet’s cognition theory. Their relevance to this work is significant in the sense that they provide tools to compare Chinese culture to British by grouping national cultures based on certain aspects.

2.1 Defining usability

At its core, the term *usability* is used to describe how easy it is to use a product. The object of use can be anything a human interacts with, but, in this context, the focus is on

the usability of digital products, namely websites. Usability is closely related to terms such as *user experience* (UX), and *user interface* (UI). User experience is a broader and more vague term that refers to the whole process and experience of interacting with a product or company. User interface, in turn, refers only to the design of the interface. While a good UI certainly improves UX, it is possible to have a good UI and bad UX and vice versa. The empirical research conducted later in this study analyses specifically the UI elements on websites.

Usability on the other hand is a little more complex to define. While user experience is a very subjective measurement, the core idea is very simple – user’s experience as the name implies. Usability is also very subjective, yet one can easily think it is simply a collection of static attributes. UI and UX consulting company Nielsen Norman Group defines usability as a sum of five factors (Nielsen, 2012):

- learnability,
- efficiency,
- memorability,
- the number of errors the user makes, and
- user satisfaction.

However, there are several definitions for usability, all of which differ more or less from each other, even just inside the Western culture. For example, Frandsen-Thorlacius et al. (2009) notice that usability is often written from a Western perspective. They compare how the Danish and Chinese participants ranked different usability aspects in a questionnaire survey. They notice that usability definitions are often closer to their Danish participants’ feelings than that of their Chinese participants. The main difference is that the Danish users thought effectiveness is critical. On the other hand, Chinese users tend to find visual appearance more crucial than the Danish, who think it is between “not very important” and a “little important”, which is 40% lower than the Chinese responses. The Chinese also found satisfaction important when the Danish rated it to be of little importance. However, the most significant difference was on the fun aspect, which the Chinese participants found a lot more crucial than the Danish. The Danish, however, thought that non-frustration was more important than the Chinese.

In conclusion, the study by Frandsen-Thorlacius et al. shows that the answers to questions about the absolute and relative importance of usability aspects differ across cultural backgrounds. The Chinese respondents value visual appearance, satisfaction, and fun more than the Danish respondents, who place more importance on effectiveness and the lack of frustration. Nonetheless, both Chinese and Danish respondents considered non-frustration the most important and fun the least important among the satisfaction-related aspects of usability despite the differences in emphasis mentioned above. (Frandsen-Thorlacius et al., 2009)

The study also found that in addition to the differences in preferences between national cultures, other subcultures may also affect the emphasis placed on different usability aspects. For example, there was no significant difference in the appreciation for the ease of use between the Danish and Chinese participants as a whole. There was, however, a difference between male and female participants within both cultures, with females ranking the ease of use higher than males. (Frandsen-Thorlacius et al., 2009)

Barber and Badre (1998) take the importance of culture in usability research even further. They use the word *culturability* to emphasise the importance of the relationship between culture and usability in web design. They performed a systematic usability inspection of several hundred websites from different cultural and linguistical backgrounds. This was done to identify design elements specific to certain cultures or genres and find out if there is a relationship between culture and genre as reflected in web design. They define cultural markers as elements that are most prevalent and possibly preferred within a particular cultural group.

Despite variations in the understanding of usability between cultural groups, Clemmensen and Roesse (2010) claim that the Western view is still dominant in the academic world. They conducted a study to analyse academic publications from the past decade related to culture and usability. Clemmensen and Roesse note that most literature described measuring usability solely from a Western point of view. When studies do consider the effect of cultural background on user experience, they mainly use international students due to a small budget. Clemmensen and Roesse note that this might distort results as

students, especially those who already have connections abroad, may be more used to different types of user interface styles.

Based on the introduced works, it can be concluded that ultimately a detailed definition for usability fit for every situation is impossible to provide due to its context-dependent nature. Despite this, it can be argued that the key idea in usability is that a product should serve its users' needs as effectively as possible, whether it means being as efficient as possible or enabling exploration.

2.2 Chinese design overview

It is well known that since the 1990s, the Chinese government has been controlling and monitoring the internet. In essence, this means censoring information within China and often blocking or filtering information from other countries. This system, also known as the “Great Firewall”, works as a virtual boundary separating the internet in China from the rest of the world. Yang (2012) argues that the internet in China has become separate enough or “domesticated” to the extent that we should be talking about the *Chinese internet*, not just the internet in China. He notes that the Chinese internet has global features, and yet it has distinctly Chinese characteristics that make it its own separate entity with its own design conventions and rules.

The growing focus on web design is considered to be a relatively new phenomenon in China, with the workforce consisting mainly of young individuals. According to a Chinese survey from 2018 (IXDC, 2018), 81% of the respondents were under 30 years old, and 64.7% had under three years of work experience in the field. Only 5.6% of the respondents have eight or more years of experience. Even though the design industry on a global scale does seem to prefer young individuals (designcensus.org, 2019), this supports the assumption that UI/UX designer has become a separate role in the industry only recently.

One thing that might also significantly impact the Chinese web design style is the emphasis on mobile devices. As early as 2014, CNNIC (China Internet Network

Information Center) reported that more Chinese people access the internet from a mobile device than a PC (cited in The Next Web, 2014). China was the first country to pass this milestone (The Next Web, 2014), so it does not surprise that China is a world leader in mobile-first design. Although the percentage of all internet usage remained slightly bigger for desktops until 2016, today around 63% of all Chinese internet usage is done on a mobile device, while desktop usage accounts to around 36%, the remaining 1% being tablet usage (StatCounter, 2021a). Due to the high usage of mobile devices, Chinese companies have been designing mobile first and even mobile only for years. It is thus easy to assume that Chinese companies might pay less attention to desktop versions.

A popular trend in China's mobile market is that successful apps generally have a lot of features, sometimes even seemingly unrelated to the original purpose of the app (Yang, 2019). A good example of this is WeChat (Chinese: 微信, *Wēixìn*), which includes a lot of additional content besides the obvious messaging, such as ordering food, buying movie tickets, playing games, mobile payments, and meeting strangers, to name a few (Zhu & Liang).

Another interesting characteristic of the Asian market, China included, is its *cuteness aspect*. Many designs aimed at grown-ups feature cute characters and pastel colours. Examples of this are many, but below are screenshots taken from Ctrip's and Bank of China's homepages featuring cute cartoon imagery (Figure 1 and Figure 2, respectively). Marcus & Ma (2016) suspect that this may stem from the popularity of anime, comics and electronic games in east Asia, as the audiences for these are no longer limited to children, teenagers and young adults. Brejcha et al. (2013) also mention similar results. They note that Chinese users like to see cartoon imagery such as cute little animals, which plays an important part in communication even in content aimed at adults.

Finally, Romeo, Karreman & Li (2016) point out that often convenience is more important to Chinese users than clarity. Due to this, apps like WeChat can have many different features and functionalities seemingly unrelated to each other and the original purpose of the app, which contradicts the western ideology of single-functionality apps.

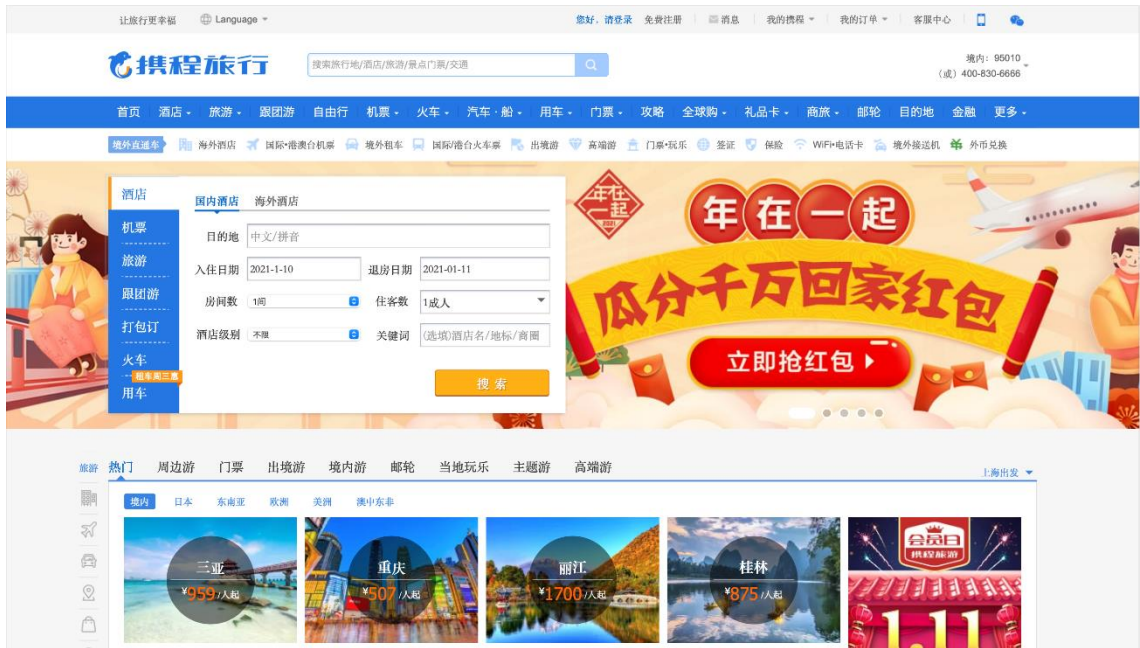


Figure 1: A screenshot from Ctrip

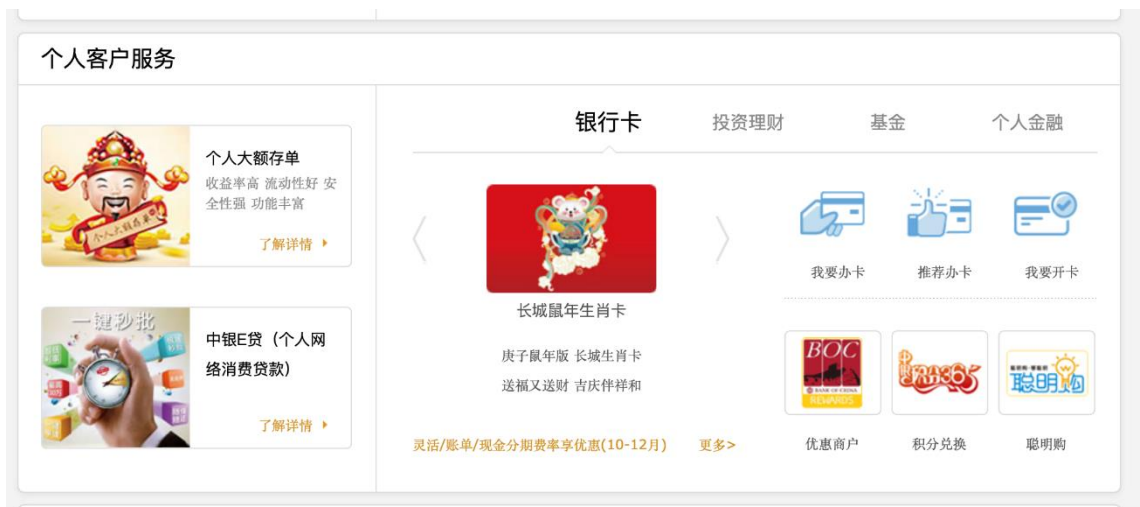


Figure 2: A screenshot from Bank of China

2.3 Western design overview

The most distinctively different aspect of Western UI design, compared to Chinese, is perhaps the ideology that each product should focus on only one thing and excel at that. This was already established in 1978 as the *Unix philosophy*, which stated that “Make each program do one thing well. To do a new job, build afresh rather than complicate old programs by adding new ‘features’” (McIlroy, 1978 p. 1902). This is still recommended quite often in different guidelines for designers (e.g. Savvy, 2019; Favell, 2016). This is very different from the Chinese culture, where products are often expected to have a lot of different features, as discussed above.

In the UK, mobile internet usage briefly surpassed desktop internet usage at the end of 2019, but later at the beginning of 2020, desktop claimed the bigger percentage again. After this the internet use on mobile and desktop devices has been quite evenly tied. Currently, desktop internet use is at around 49%, while mobile use is at 45%, the remaining 6% being on tablet devices. While mobile has steadily been growing its share of internet use, it is important to recognise the difference in perspective between China and Western countries such as the UK. In the Western world, people are slowly switching from desktop to mobile, as the majority of people were introduced to the internet via desktop. In China, however, a large part of the population completely skipped the phase of owning a personal PC and moved straight from no internet to mobile internet. (StatCounter, 2021b)

In Western design, *white space* is often regarded as a highly important element, and a huge factor in making the user experience better and user interface more pleasant. White space or negative space is an empty space between, around and inside individual design elements of a page. In general, using white space generously is recommended by design experts for elegance and ensuring a quality user experience. Apple’s website is a classic example on using a lot of white space to guide user’s attention instantly on one important focus point, often a new product (see Figure 3).

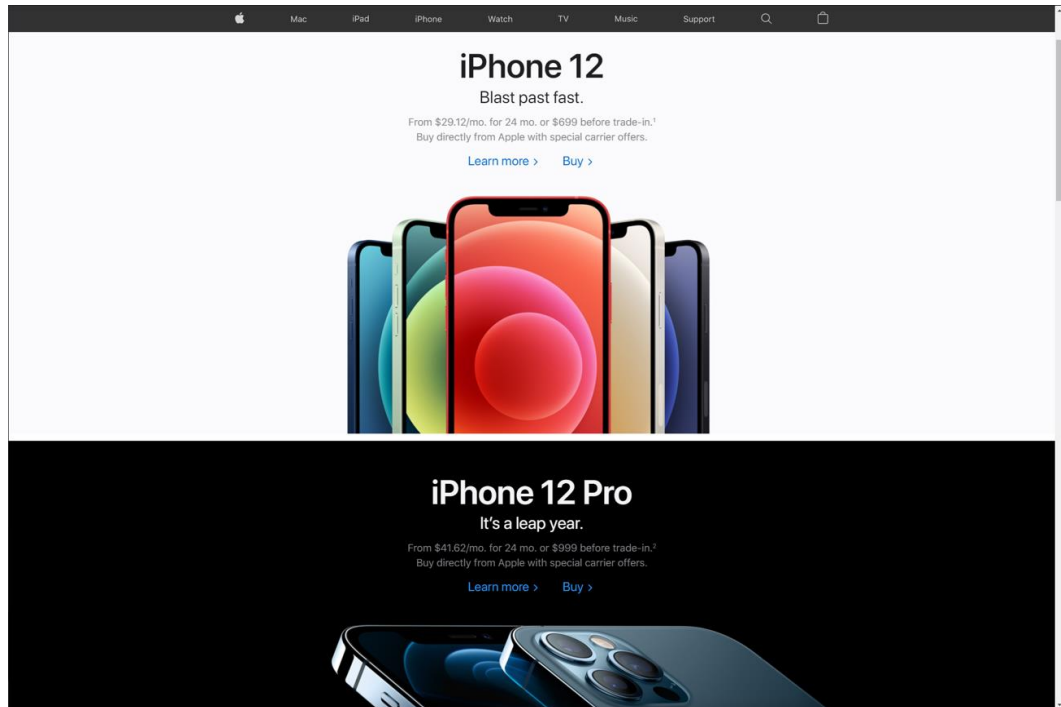


Figure 3: Apple homepage (Apple)

Some key benefits of white space are considered to be that it can be used to group or separate elements. The principles of grouping or Gestalt laws of grouping is a set of principles proposed by Gestalt psychologists to account for the observation that humans naturally perceive objects as organised patterns and objects. The Gestalt law of proximity states that elements appear to form groups if they are placed close to one another (Wagemans et al., 2012). This also works the opposite way, and elements with a lot of white space around them appear separate. This way white space can be used to bring focus to a particular element, such as the product, to make it appear more important by making it separate from other elements. Returning to Figure 3, the Gestalt law of proximity can be observed here, as for example, the iPhone 12 promotional image and text appear to form one group due to the close placing of the elements, yet the group is separate from the rest of the content as it has a lot of white space around it.

Similarly, Chaparro et al. (2004) show that the use of large margins increases comprehension of text with the cost of reading speed. Using more white space between lines of text (i.e. leading) resulted in higher user satisfaction, even though it did not impact

the reading performance. All in all, almost half (47%) of the participants chose larger margins and larger leading as their preferred layout out of the four options, while half (50%) of the participants chose smaller margins and small leading text as their least favourite.

2.4 Cultural models and theories

This section introduces three popular cultural models and theories. They are often used to group cultures based on differences and similarities in the people's behaviour. Having clear cultural differences is an essential part of a comparison between cultures, because without differences a comparison would be meaningless.

Hofstede's model is used, because it has been by far the most popular cultural model used in information systems research, dominating the field easily. While Hall and Hall's model is not as popular as Hofstede's, it is still a relatively well-known model that fits the subject of this study well. It is also very popular in the communication field, rivalling Hofstede's model in overall popularity (Cardon, 2008). Hall and Hall's model is also relatively often used together with Hofstede's model, just like in this study. Nisbett's cognition theory is presented here, because it offers an interesting aspect to how Western and Asian audiences perceive scenes differently, which might be reflected on how they view webpages. (Raja Mohd Ali et al., 2009)

2.4.1 Hofstede's cultural dimensions

Hofstede initially based his cultural model on the results of a worldwide survey of employee values by IBM, which was conducted between 1967 and 1973. Later on, Hofstede studied more countries and based on the results, even added two more dimensions. In the 2010 edition of Hofstede's book *Cultures and Organisations: Software of the Mind* scores on the dimensions are listed for 76 countries. Furthermore, even more countries have been listed on the website hofstede-insights.com, from which the cultural data used later in this study is retrieved.

The cultural aspects Hofstede has discovered are:

1. *Power distance*: How well people accept inequalities in society?
2. *Individualism versus collectivism*: Is the culture more individualist, i.e. people consider themselves independent from a group or more collectivistic, i.e. people see themselves firstly as a part of a group such as family?
3. *Masculinity versus femininity*: Is the society more of the competitive type or is caring for the weak considered important?
4. *Uncertainty avoidance*: How well people tolerate uncertainty, ambiguity and unstructured situations?
5. *Long term orientation*: Do people honour traditions or preparing for the future more?
6. *Indulgence versus restraint*: To what extent people try to control their desires and impulses?

Each country is given a numeral score in each of these aspects. These scores can then be compared to one another to analyse the differences between cultures. Below are results for China and the UK (Figure 4). As seen from the results China and the UK have some clear cultural differences. These biggest cultural differences are recognised as power distance, individualism, long term orientation and indulgence by Hofstede.

Typically, national cultures within a larger cultural group have rather similar results. For example, when comparing the UK with other Western countries such as the US, Australia and Canada, the general results are very similar despite small variations in some aspects, as can be seen from Figure 5. Based on the results from Hofstede's model, it can be argued that the results discovered later in this study can be assumed to apply to other Western countries to a large extent as well.

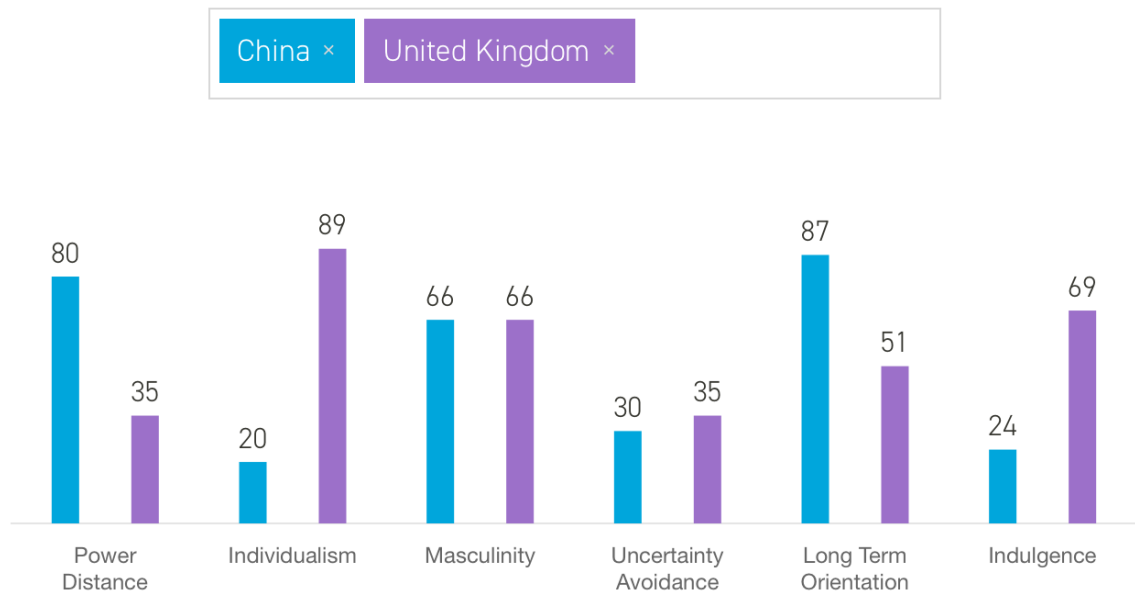


Figure 4: A comparison of Hofstede's cultural values between China and the UK. (Hofstede Insights, n.d.-b)

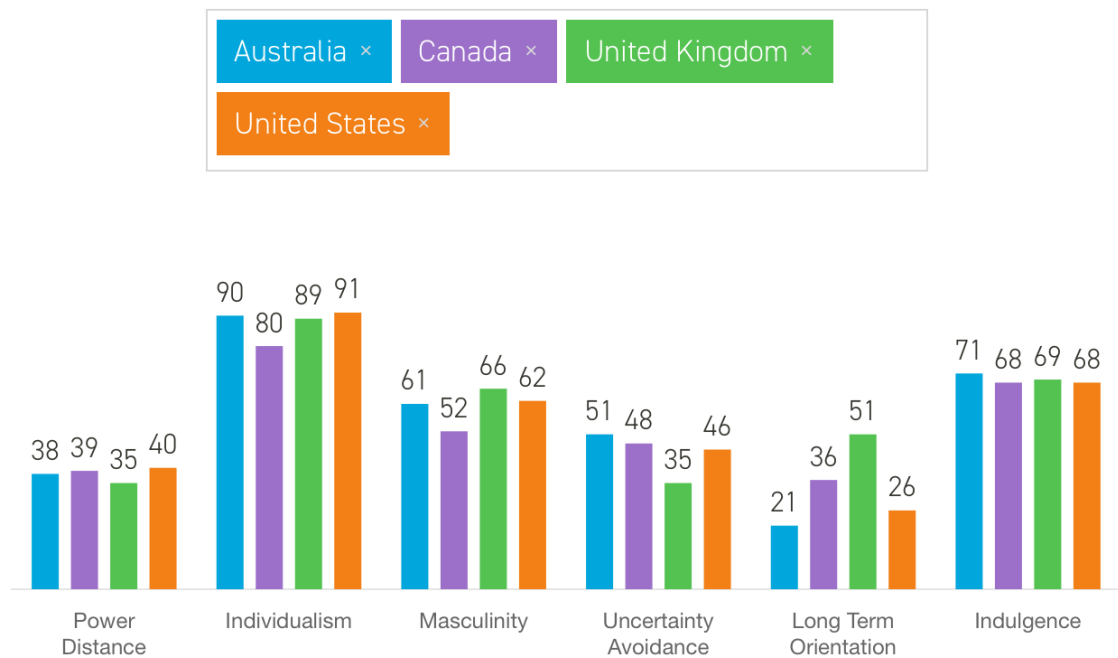


Figure 5: A comparison of Hofstede's cultural values between Australia, Canada, United Kingdom and United States. (Hofstede Insights, n.d.-a)

Hofstede's work has been a prevalent basis for cultural comparisons in many fields of study, presumably because it allows national-level standardised analysis on many countries and facilitates comparisons (Ford et al. 2003; Annamoradnejad et al. 2019). The tangible scores also make it very easy to use. In addition to being a relatively easy comparison tool, the previous studies have shown that Hofstede's dimensions can indeed be linked to users' design preferences. (e.g., Burgmann et al. 2006; Callahan 2005; Dormann and Chisalita 2002).

Due to being such a popular cultural model, Hofstede's work has also received much criticism. Many of these criticising works date between 2000 and 2010. The five major criticisms according to Sent & Kroese (2020) are that surveys are unsuitable for measuring cultures, the study reduces culture to nationality, the participants are mostly IBM employees and thus a poor representation of the whole society, the data is largely old and thus outdated and that four to six dimensions are not enough to define a whole culture. As there has been studies validating Hofstede's findings, so there have been ones proving that they are not always right, such as Khashman & Large (2013). However, this study focuses on Arabic interfaces, and it is thus considered not to invalidate using Hofstede's model in this study, where the focus is on China and the UK.

2.4.2 Hall and Hall's cultural model

Another well-known cultural model is Hall and Hall's model from 1990. In this model, cultures are classified based on two factors, context and time. *High-context cultures* such as China feature a lot of implicit communication and rely heavily on context. *Low-context cultures*, which most Western countries represent, on the other hand rely much more on explicit verbal communication. Perception of time is divided into *monochronic* and *polychronic*. Monochronic cultures, like the Western countries, are more focused on a single task at a time, while polychronic cultures, such as China, prefer multi-tasking. It needs to be noted though, that the distribution of cultures into categories such as high-context and low-context is not a simple matter of grouping them absolutely. Instead, this should be seen as a spectrum, on which cultures are positioned somewhere between the

high and low ends. Hall and Hall's model further supports comparing the UK and China, as the cultures differ on both aspects discovered by Hall and Hall.

Hall and Hall's model has often been used by studies that involve communication (Raja Mohd Ali et al., 2009). This is presumably because their basis for cultural characterisation is communication. However, this cultural model is not perfect either. Even though Cardon (2008) observes that Hall and Hall's works have received less criticism than Hofstede's cultural model, they have not been empirically validated enough to be used to draw firm conclusions. This might be partially due to Hall and Hall's model being vaguer in its presentation than Hofstede's model, for example ranking cultural groups instead of national cultures.

2.4.3 Nisbett's cognition theory

In his work, Nisbett recognises two different cognitive styles – holistic and analytic. As summarised by Dong & Lee (2008), the original study (Masuda & Nisbett, 2001) was conducted by showing Japanese and American participants animated images of underwater scenes such as the one presented in Figure 6. The participants were then asked to remember and describe the picture. The result was that the Japanese participants commented about 70% more on the general environment and surroundings and made twice as many statements on the relationships between the fish and the background than the American participants. This implies that the East-Asians are more focused on the whole (i.e. holistic thinking), while Westerners focus more on objects (i.e. analytic thinking).

Dong and Lee (2008) have further used Nisbett's cognitive styles as a basis for comparing user interface preferences between East-Asian users and Western users. They demonstrated with the help of eye-tracking technique that holistic and analytic thinkers also view webpages differently. The Chinese and Korean (holistic cultures) participants tended to scan the page back and forth and were more likely to scan the page in a circular motion, suggesting that they indeed see the page as a whole, as suggested in Nisbett's theory. The American (analytic culture) participants preferred to read the page more

sequentially, focusing on each piece of information one by one. They also tended to read more carefully through the navigation bar to get an overview of the page, which is again in line with Nisbett's findings.

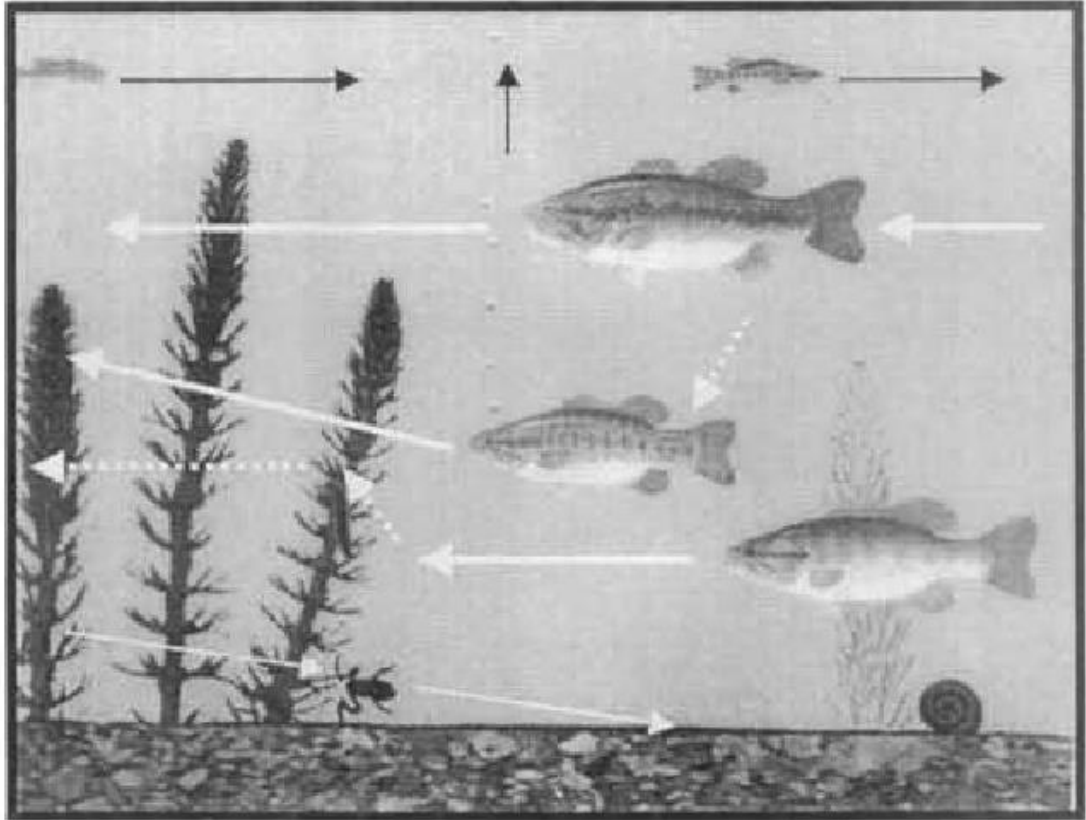


Figure 6: An example of an animated image used in Masuda and Nisbett's study. The arrows refer to the directions of the fish's movements. (Masuda & Nisbett, 2001)

Dong and Lee's work indicates that the target audience's cognitive style should be taken into consideration when designing webpages. Although designers most likely rarely think consciously about cognitive styles, the culture and style they are used to affect their work. It can be further argued that websites are structured differently based on where they are designed. The implications made by Dong and Lee's study based on Nisbett's cognition theory further prove that researching the differences in existing user interfaces in China and the UK is necessary for cross-cultural design.

3. Related works

The reader is now acquainted with the context for this field of study in general. This chapter focuses more on introducing previous literature related to the subject of this study. The first part of this chapter reviews previous academic works. The main point of view is identifying differences in design, so the studies included here are also introduced from that angle. Even though the focus is on Western and Chinese design, some works analysing slightly different cultural groups are also included if they are seen to provide valuable lessons for the purpose of this thesis.

Later, non-scientific, i.e. not peer reviewed articles around the internet are also discussed. These articles are included, because they offer insight to what people in general think about the design differences between China and the West, as opposed to just academic context. It also has to be noted that most of these writers are indeed professionals in the field of cross-cultural study and thus writing from a long personal experience. Design is also a rapidly evolving field, which is why these non-academic articles and blog posts can reveal some ideas that academic works have yet to discuss.

Lastly, this chapter is concluded with a short discussion. Here, the key takeaways from this chapter are summarised and the ground for the need of more research is further established.

3.1 Scientific works

Alexander, Murray and Thompson (2017) study the differences in website design among different cultures to create a cross-cultural web usability model. The purpose of the model is to offer website design guidelines and a usability measuring instrument to raise overall user satisfaction. The proposed guidelines are then used to create cross-cultural websites that are suitable for the target culture. To create the model, Australian, Chinese and Saudi Arabian webpages were evaluated.

The model is based on prominent design elements, which were discovered by analysing websites. A design element is considered to be prominent if the difference in the rate of occurrence between two cultural groups is greater than or equal to 40%. The prominent design elements are categorised into seven categories: layout, navigation, links, multimedia, visual representation, colour, and text. (Alexander, Murray and Thompson, 2017)

Chinese prominent design elements are:

- High use of visible items (headings, links and images) in a webpage
- High display density
- More than 10 visible links in the main menu
- High use of links
- Links that open in a new window
- External links
- Image/text animation
- Image/text scrolling
- Use of images
- Image of political
- Bright colours with traditional colours
- Use of boldface
- Use of headings

Australian prominent design elements are:

- Dynamic main menu
- 2 levels of choice in the main menu
- Fat footer
- Images of young individuals

The study approaches designing for cross-cultural user interfaces by measuring and essentially mimicking existing user interfaces and deriving preferences from there. The most notable thing in Alexander et al.'s work in the context of this study is that, like this

thesis, it tries to recognise the UI elements typical for specific cultures and list them to facilitate future design work.

Brejcha et al. (2013) also attempt to establish a usable set of guidelines regarding Chinese user interface design to facilitate designing for Chinese audience as a mainly Western designer. The guidelines were based on hypotheses that were proven right or wrong by one-to-one and one-to-many interviews supported by questionnaires. The study compared Chinese and Czech students' preferences. The interesting note here is that the preferences between different cultural groups are not as big as assumed. Instead, Brejcha et al. also conclude that while clear cultural differences do exist, globalisation clearly has affected the preferences and expectations on user interface elements.

Al-Khalifa and Garcia (2014) analyse differences in design between Saudi-Arabia, the Philippines and India by comparing government websites from each country. Like Alexander et al., they divide the design attributes into five categories: visual presentation, navigation, links, layout and multimedia. However, the result differs in that Al-Khalifa and Garcia do not find any significant differences among the website attribute preferences between the countries involved, and thus conclude that there are no major differences in web design between these countries. Two major reasons for this failure to find cultural differences are that they only compare a few government-upheld websites instead of a larger sample and that the cultures they are comparing had too similar cultural scores according to Hofstede's model. They are also all considered to be high-context, polychronic cultures.

Hsieh (2014) conducts a web experiment by applying the content of two websites of the government genre to construct experimental websites. She uses Taiwanese and Australian participants to study efficiency and the number of errors based on user interface preferences. She chooses Taiwan and Australia on the basis that they have different enough cultural scores based on Hofstede's cultural dimensions. Hsieh observes that the time spent on the website and the number of clicks needed were lower when using a version localised for the participant's target culture than using the version localised for the other cultural group. This suggests that efficiency increased, and the number of errors decreased.

Regarding satisfaction, however, Hsieh found out that while the Taiwanese participants were clearly more satisfied with the Taiwanese version of the website, contrary to expectations, Australian users were also satisfied with Taiwanese style visual representation. Hsieh concludes that as culture keeps evolving, a possible explanation for this could be that particularly younger audiences might be more influenced by other cultures.

Reinecke and Bernstein (2013) are not content with just designing differently for different cultural groups and localising websites but argue that user interfaces could and should automatically adapt to the user's cultural background. Their model, MOCCA, takes into consideration the user's current and former countries of residence to present them with the optimal layout. They also use Hofstede's cultural model to assume what elements and what kind of style the user will most likely prefer.

To evaluate MOCCA and its adaptation rules, Reinecke and Bernstein asked multicultural, Thai, Rwandan and Swiss participants to choose their preferred UI elements. These results were then compared to the interface MOCCA created for them. The result was that MOCCA was able to predict up to 61 per cent of the users' preferences. They also asked the participants whether they liked the auto-generated user interfaces they were presented with. What Reinecke and Bernstein showed with their experiment is that the majority of participants within the same country had similar user interface preferences. As the results also varied between different groups, it can be said that preferences are to some extent dependent on national culture. (Reinecke and Bernstein, 2013)

The limitation of this study that Reinecke and Bernstein do not address is that they compare the user interfaces created by MOCCA to randomly created user interfaces. While this proves that MOCCA does do something right, it does not say how MOCCA would fare against a professional UI/UX designer who knows the target culture. It must also be noted that while MOCCA predicted the majority of participants' preferences accurately in Switzerland and Thailand, its prediction accuracy for Rwanda was only 24.4 per cent. While the failure to predict Rwandan preferences might be a result of many different factors, the negative result for Rwanda means that MOCCA cannot be assumed to work automatically for any country. Reinecke and Bernstein conclude that this serves

as a reminder that in the case of automatically generated user interfaces, the user should be allowed to change the elements manually if needed. (Reinecke and Bernstein, 2013)

3.2 Non-scientific articles

The internet has numerous articles on how Chinese and Western web design differ from each other. The key Chinese design elements in comparison to Western design mentioned in the non-scientific design articles reviewed for this study are listed in Table 1 along with their sources. The categories are not from the articles themselves, but invented for the purpose of this study to divide the elements into meaningful groups. This overview summarises themes from ten articles in total. The most common elements mentioned were that the Chinese websites had more colour, high text density and utilised page space fully, i.e. did not have white space. Busy layout was also listed three times. The common theme in these elements is that they imply a lot of visual stimulation to the user.

3.3 Discussion

Both the scientific and non-scientific works seem to indicate that there are discernible differences in Chinese and Western design. However, based on these works it is not totally clear what kind of attributes are involved. There is a clear lack of rigorous approach to line them out and how they could be measured objectively. The results are also often interesting but cannot be used as guidelines for designers to better consider international audiences.

This gives us the reasons to formulate a methodological approach introduced in the next chapter. The research conducted in this thesis includes 48 websites, which is a bigger sample than what most of the studies listed have. In addition, data is collected from existing websites, not hypothetical examples like some previous studies. Listing simple hypotheses related to different aspects in Chinese web design and analysing the websites through them also helps in providing results that can be easily applied to practice.

Table 1: Key elements of Chinese design

Category	Elements	Sources
Typography	Lack of web fonts	(Chew, 2015)
	Less variation in font sizes	(Zhong, 2018)
Colour	More colourful	(Cheng, 2017), (Hub of China), (Maruma, 2014), (Kravtsov, 2019)
Navigation	Vertical layout for global navigation	(Malachi, 2017)
	Horizontal submenus	(Cheng, 2017)
	Grid menus	(Kravtsov, 2019)
	Lots of categories of choices in no particular order	(Zhong, 2018)
	Lots of links	(Maruma, 2014), (Hopwood, 2019)
	Link-based navigation instead of text search	(Chew, 2015), (Hopwood, 2019)
Page length	Shorter pages (max 2 screen lengths)	(Cheng, 2017)
	Infinite amount of scrolling	(Hub of China)
General feel and layout	Appear to have a lot of text/high text-density	(Zhong, 2018), (Hub of China), (Freshtrax blog, 2013), (Tech Collective, 2018)
	A lot of pop-up windows	(Maruma, 2014), (Freshtrax blog, 2013)
	Animated elements	(Hopwood, 2019)
	Busy layout	(Chew, 2015), (Maruma, 2014), (Hopwood, 2019)
	Utilising page space fully and/or no white space	(Chew, 2015), (Zhong, 2018), (Cheng, 2017), (Hub of China), (Hopwood, 2019)
Ads	Use of Flash ads	(Maruma, 2014)
	Lots of ads	(Maruma, 2014)

4. Methodology

This chapter introduces the methodology used in this research. The purpose of the empirical study in this thesis is defining key differences between Western style of website design and Chinese style of web design by conducting a comparative analysis. This is done by firstly reviewing previous academic works and non-academic articles related to the subject. Secondly, hypotheses are formed based on these findings. Thirdly, data is collected from websites originating from the UK and China. Finally, the collected data is analysed, and hypotheses are evaluated based on the results.

This chapter begins with a section explaining the basis on which the websites were chosen for this study. After this, the research hypotheses are listed. Lastly, the methods for data collection are described.

4.1 Websites

A total of 48 websites were analysed for the purpose of this research. The websites were distributed evenly to represent both cultural groups, with 24 websites originating from China and 24 originating from the United Kingdom. The sites were chosen so that each site has a pair in the other group representing a similar website. For example, Aviva and China Life are big insurance companies in UK and China, respectively, so it was deemed appropriate to compare them in the context of this research.

Frandsen-Thorlacius et al. (2009) as well as Barber and Badre (1998) question, whether genre plays a part in users' perception of usability and preference on prominent design elements. This study attempts to analyse a broader range of websites to find generic results that could be applied to a large number of websites from different genres. For the purpose of choosing the websites for this study, a mind map was constructed containing different website types a person might visit. The website types were designed to be rather common, e.g., university, insurance, café, government, public transport, e-commerce and other similar ordinary websites. The study tries to focus on popular websites and exclude

very niche websites as it is uncertain whether those represent the general design principles from a culture.

After the website types, or genres, were chosen, the actual websites were selected. The only requirement was that the company or brand should be well-known and/or popular within the target culture in addition to fit into the genre. Only one or two websites were chosen per type. For example, when choosing websites for the banking genre, two of the biggest banks in both researched cultures were chosen.

In some rare cases, a suitable website was not found from within the target culture. In this case a website from the same larger cultural group (Western or East-Asian) was chosen. For example, China had its local online payment platform Alipay, but PayPal was considered to be its closest equivalent in the UK, despite being American. For this reason, the UK version of PayPal's website was chosen to represent British and Western design. A complete list of all the websites used in this study can be found in Appendix A and Appendix B.

Only the homepage of a chosen website is analysed, as it is considered to be a sufficient representation of the website for the scope of this research. Usability experts such as Jakob Nielsen and Kyle Soucy write that homepage is the most important part of the website, and often the first contact point the user has with the site (Soucy, 2007; Nielsen, 2002). Further analysis of the website is thus considered to bring no relevant extra information. It also needs to be noted that analysing the whole website with all its subpages would prove a tedious and time-consuming task due to their complex structure, and yet offer negligible benefits. Only the design elements are taken into consideration. The actual content of the website is not part of the analysis, which is why language barrier does not prevent from gathering data.

4.2 The hypotheses

The seven research hypotheses based on the findings from the literature review are:

(RH1) The variation in font sizes is smaller in Chinese websites than in British websites.

(RH2) Chinese websites use a more limited collection of fonts than British websites.

(RH3) Chinese websites use a wider colour palette than British websites.

(RH4) Chinese websites feature moving elements (e.g., rotating banners) more often than British websites.

(RH5) Chinese Websites feature vertical layout for global navigation more often or as often as horizontal layout.

(RH6) Horizontal submenus are more common in Chinese websites than British websites.

(RH7) Chinese webpages are shorter on average than British webpages.

The hypotheses aim to measure five different key aspects of web design:

- typography,
- use of colours,
- movement,
- navigation, and
- length of webpages.

This list is not exhaustive, as many other things could also be measured. These aspects were chosen, because they can be easily measured with numbers or percentages, i.e. how many websites feature the element in question. Thus, they also enable easy comparisons between the design cultures, as all the collected data has either a numeral or percentage value.

Some aspects that appeared often in the literature were left out because they could not be measured as easily as others. For example, a “busy layout” is very hard if not impossible to measure objectively.

4.3 Data collection

Most of the data is collected from the live website with the help of the Google Chrome browser's developer tool's web inspector. This is because the web inspector is an easily accessible, free built-in tool to view the website's CSS¹ styling. Retrieving the used styles such as fonts, text sizes and colours directly from the website's CSS makes it possible to get accurate and absolute data easily. To rule out the possibility of the website being in the middle of change or taking a sample from the middle of, for example, A/B testing, the websites were revisited a while later to check that the layout was still the same as before. The websites were documented in PDF format after collecting the data between January 10th and February 24th, 2021 to preserve how they looked. The collected data was then compiled in tables and analysed using Microsoft Excel.

This research method resulted in quantitative (or statistical) data. Quantitative data is good for this type of research, because it can be generalised to represent a larger group as long as the sample is representative enough. In this case, it can be assumed that the results also apply to a large number of other Chinese websites as well. Even though quantitative data allows for collecting a lot of data relatively easily, the downside of using it is that it might be an insufficient tool for explaining the reasons behind the phenomena.

¹ *Cascading Style Sheets*, a style sheet language used to alter the presentation of a document written in a markup language such as HTML.

5. Results

The empirical study is conducted in accordance with the methodologies presented in the previous chapter. The results from this study are now presented in this chapter. The first section is an overview of the results in general. The overall results are presented in tables that include all the collected numerical data grouped by type. After this, the data is combined with the hypotheses that were formed in section 4.2. Even though the hypotheses are grouped into three larger categories for the structure of this thesis, each hypothesis is discussed separately by first listing whether it was confirmed or not, and then explaining the relevant data and how it confirms or disconfirms the hypothesis in question.

5.1 Overall results

Table 2 and Table 3 contain an overview of the collected data. The data is divided into two tables based solely on whether it is an average or a percentage value. The type of value on the other hand is selected based on which is more natural for the element. The elements on which the data is collected are based on the hypotheses. In addition to the tables, Figure 7 presents the data from Table 3 as a histogram. For tables containing all the detailed data website by website, see Appendix A and Appendix B.

The first column on the tables is category. The categories here are the same categories the hypotheses can be grouped into. The purpose of this column is to help the reader scan through the data and see quickly which elements are related to each other. It also helps to deduce which hypothesis the data is related to. On Table 2 both the average and median value are listed for each element and for both countries. This is done in an attempt to prevent websites which significantly differ from others from the same group affecting the result excessively.

In general, the results indicate that there are differences between Chinese and Western design styles. The most significant differences seem to be the use of animated elements and text within images, which are present in all Chinese websites analysed, but are not

very common on British websites. Another major difference seems to be related to submenus, with the Chinese websites using vertical, horizontal, and multi-column styles equally, while the British websites clearly prefer multi-column submenus.

Table 2: Averages and medians of numeral values

Category	Element	UK average	UK median	China average	China median
Typography	Number of different font sizes used	7.04	7	6.00	6
Typography	Body text size	15.58	16	13.38	12
Typography	Number of fonts used	1.38	1	2.04	2
Colour	Number of colours used in total	8.33	8	11.29	10
Colour	Number of colours used in text	5.38	5	8.04	7
Colour	Number of colours used in background	4.71	4.5	4.54	4
Navigation	Number of links	6.61	6	9.27	8
Length	Page length in px	4384.43	3941.08	3691.26	3311
Length	Page length in screens ²	4.04	3.63	3.26	2.98

Table 3: Percentage values

Category	Element	UK %	China %
Typography	Text in image	12.50 %	100.00 %
Movement	Animated elements	25.00 %	100.00 %
Navigation	Global navigation bar exists	75.00 %	83.33 %
Navigation	Submenu exists	38.89 %	55.00 %
Navigation	Horizontal submenu ³	0.00 %	36.36 %
Navigation	Vertical submenu ³	14.29 %	27.27 %
Navigation	Multi-column submenu ³	85.71 %	36.36 %

² The length of one screen is 1085 pixels.

³ percentage out of all submenus

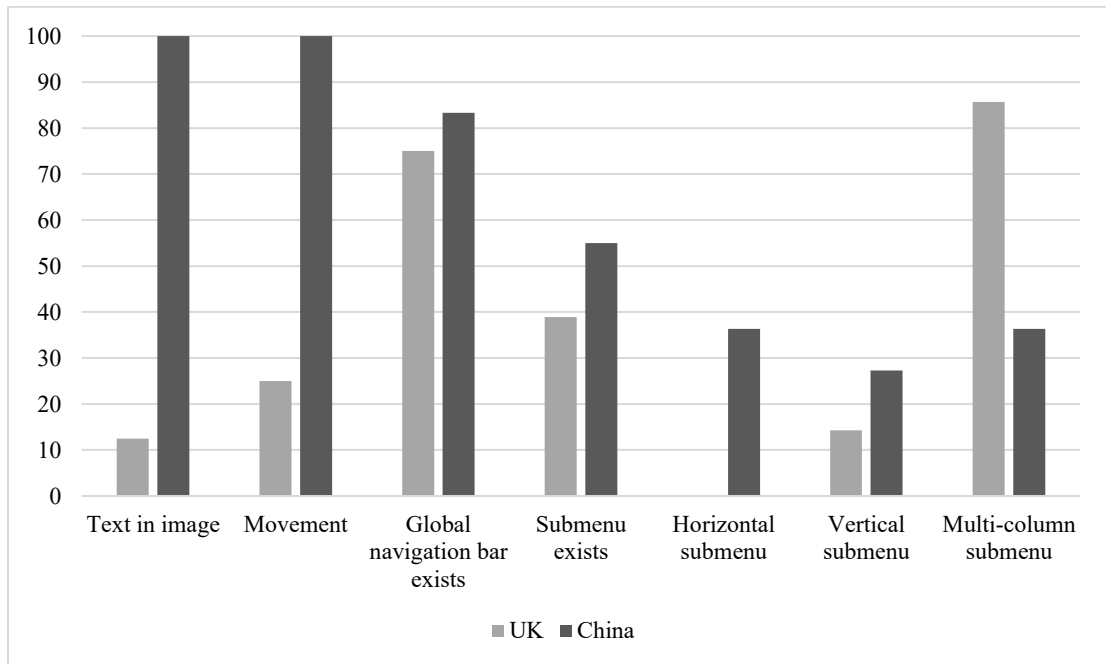


Figure 7: Values from Table 3

5.2 Typography

The first two hypotheses set in this study were the hypotheses regarding typography:

(RH1) The variation in font sizes is smaller in Chinese websites than in British websites.

(RH2) Chinese websites use a more limited collection of fonts than British websites.

Both hypotheses were confirmed. It was discovered that the average difference between the smallest and largest font size on a single page was on British websites 32.93 (median 30). On Chinese websites though, it was only 12.97 (median 9.5). The British sites' font sizes tended to range between 12.5 and 45.4 (medians 12 and 43 respectively), while Chinese sites typically ranged between 11.71 and 24.68 (medians 12 and 21). This demonstrates that there is a significant difference in font size variation between Chinese and British website design. It was also discovered that on British websites, the average number of different font sizes used was 7.04 (median 7.0). In China, the average number

was 6.0 (median 6.0), which means that British websites use one more font size than the Chinese websites.

Regarding the second hypothesis, the conducted research shows that while almost all British websites have chosen a different font to use as their main font, many Chinese sites use the same fonts. As the font used was visible on all websites researched, it can be deduced that a font was defined for all of them. If a default font was used, a font name would not be visible in the CSS styles through the inspector tool. For example, the most popular font Microsoft YaHei is used on 17 different websites, which is 70% of all the Chinese websites analysed in this study. Arial too was used 9 separate times, mostly for text using the Latin alphabet. On British websites only two fonts were used in more than one separate occasion (see Table 4 and Table 5 for a list of all the fonts found). For a more detailed specification on the fonts used on each website, see Appendix C and Appendix D. In total, all the Chinese websites used 20 different fonts, which means 0.83 fonts per website. The corresponding number collected from the British websites is 28 – 1.17 fonts per page. Interestingly, despite using less fonts in general, using multiple different fonts on a single webpage is more common in China than in the UK. In fact, over half (54.17%) of the Chinese websites use more than one font, while only a third (29.17%) of the British websites do the same.

Another interesting thing to note is that all 100% of the of Chinese websites featured one or more images containing text. In the UK, only 12.5% of the analysed websites had images containing text. On UK websites, a similar layout was created by adding an actual HTML⁴ text element on top of the image. Both British and Chinese website groups had websites featuring a layout with a big image in the top part of the homepage and big text on top of it, usually containing some timely information and announcements. (See Figure 8 and Figure 9 for Costa Coffee's and Peking University's homepages showing a similar layout. On Peking University's website both the big text in the middle and the mid-sized text in the bottom left corner are part of the image.) It needs to be noted that the texts placed directly inside the image were often quite large. Even though similar text on UK

⁴ HyperText Markup Language

websites affected the lists of fonts and font sizes used, on Chinese sites it did not due to technically not being text. This also affects the result on the variations in font size inside a webpage.

Table 4: Fonts used on British websites

Font name	Number of sites using
-apple-system	1
Amazon Ember	1
Brandon Grotesque	1
DysonFutura	1
Expert Sans	1
Fira Sans	1
Georgia	1
Google Sans	1
Gotham	1
Guardian Egyptian Web	1
Guardian Text Sans Web	1
Helvetica	3
Johnston100	1
Lato	1
mylius-modern	1
nta	1
Okra	1
open-sans-v15-latin	1
Oxygen	1
PayPalSansBig	1
PayPalSansSmall	1
PT Sans	1
Riviera Nights	1
Roboto	4
source_sans_pro_vf	1
Styrene	1
Trip Sans VF	1
UniversNext	1

Table 5: Fonts used on Chinese websites

Font name	Number of sites using
-apple-system-font	1
Arial	9
EB Garamond	1
F22HUNYSK	1
F2YouHK_512B	1
govwf_fzzhunysk_ys_1249317818	1
HelveticaNeue	1
LantingHei SC	1
LTZhH	1
Microsoft JhengHei	1
Microsoft YaHei	17
PingFang SC	4
Raleway	1
SimHei	1
Tahoma	2
Times New Roman	1
Verdana	1
YaHei	1
宋体	2
黑体	1



Figure 8: Costa Coffee homepage



Figure 9: Peking University homepage

5.3 Colours and movement

The third hypothesis concerned the use of colours:

(RH3) Chinese websites use a wider colour palette than British websites.

The third hypothesis also got confirmation. The average number of all the colours used both in text and on the background per webpage was 11.29 (median 10) for Chinese websites and 8.33 (median 8) for British websites.

The average number of different text colours used per page on British websites is 5.38 (median 5), while the average number of background colours is 4.71 (median 4.5). For Chinese websites the average is 8.04 (median 7). However, surprisingly, Chinese sites used slightly less colours on the background than British websites. On average Chinese websites had 4.54 (median 4) different background colours per webpage, and British websites 4.71 (median 4.5). It needs to be kept in mind, though, that some Chinese websites used images as a background for buttons, text boxes or the whole website. None of the British websites analysed was found to do the same. This means that in truth, the Chinese websites would probably have been a little more colourful.

It is important to also note that average values can be a little inaccurate due to one or two unusually big values in the sample. This has also partially happened here as can be seen from the Chinese average consistently being a little bigger than the Chinese median. Among the Chinese websites, Babytree used an extraordinarily large number of colours: 22 for text, 11 for background and 32 in total. The most likely explanation for this being that it is designed for mothers of small children and the purpose of using a large colours scale helps to create a cute and childish atmosphere. Excluding Babytree results in the average number of total colours to drop from 11.29 to 10.39, while the median stays 10.

The fourth hypothesis dealt with movement on pages:

(RH4) Chinese websites feature moving elements (e.g., rotating banners) more often than British websites.

The hypothesis was confirmed. A full 100% of Chinese websites contained moving elements. The same can be said for only 25% of the UK websites. The elements discovered on the Chinese websites were rotating banners (also known as image carousels, see Figure 10), sliding text and automatically played videos, with rotating banners being clearly the most popular of these features.

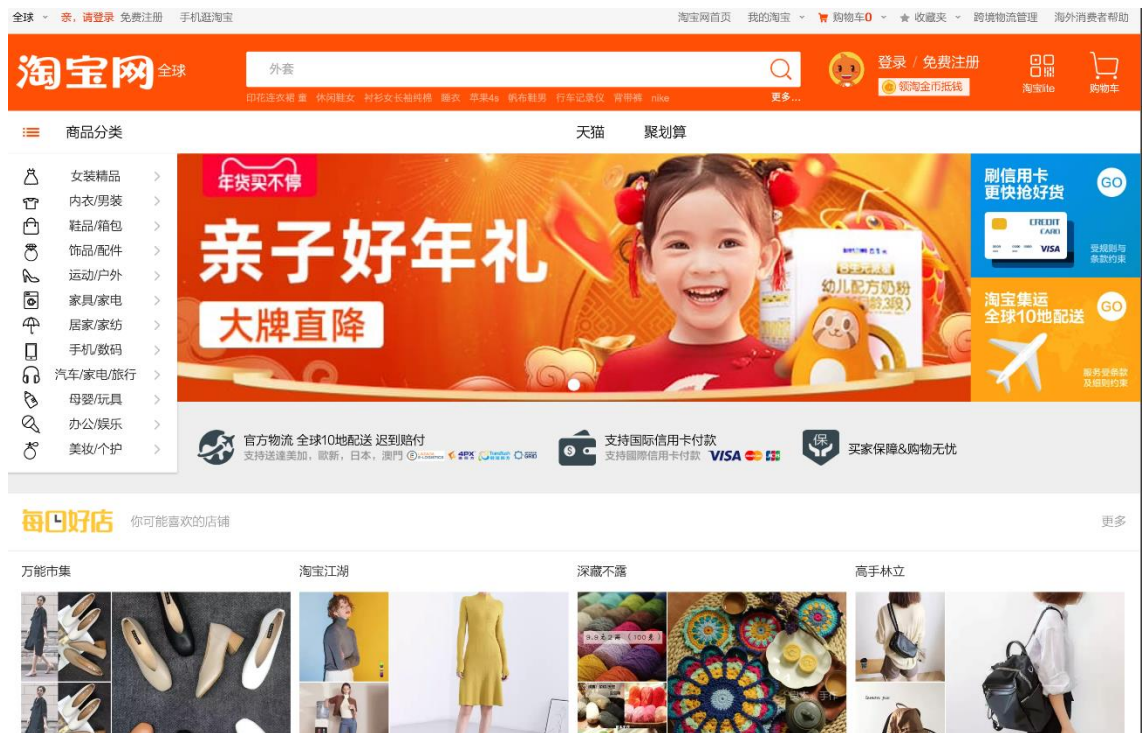


Figure 10: Taobao homepage featuring a rotating banner as an eye catcher

5.4 Layout

The fifth and sixth hypothesis concerned the layout and placement of navigation:

(RH5) Chinese Websites feature vertical layout for global navigation more often or as often as horizontal layout.

(RH6) Horizontal submenus are more common in Chinese websites than British websites.

The fifth hypothesis did not get confirmation. The sixth hypothesis on the other hand was confirmed. Despite the assumption that Chinese websites would be likely to use vertical layout for global navigation, none of the analysed websites had it. While 83.33% of all Chinese and 75% of all British websites had a clear global navigation, none of them was vertical. Taobao and Dianping did have a vertical list of categories (see Figure 11) on the left side of the main content, but this was not counted as a global navigation as it was visible only on the front page.

It was also discovered that Chinese websites have on average more links on the navigation bar. The average number of links on a navigation bar was 6.61 on British websites (median 6) and 9.27 on Chinese sites (median 8). On both cases average is a little bigger than median. This shows evidence that Chinese navigation bars do have more links than Western navigation bars, as suggested by e.g. Alexander, Murray and Thompson (2017). It is interesting to note that even though the average number of links on the navigation bar was smaller on the British websites, they also used submenus less frequently, indicating that the categories are significantly fewer on the British websites than the Chinese websites.

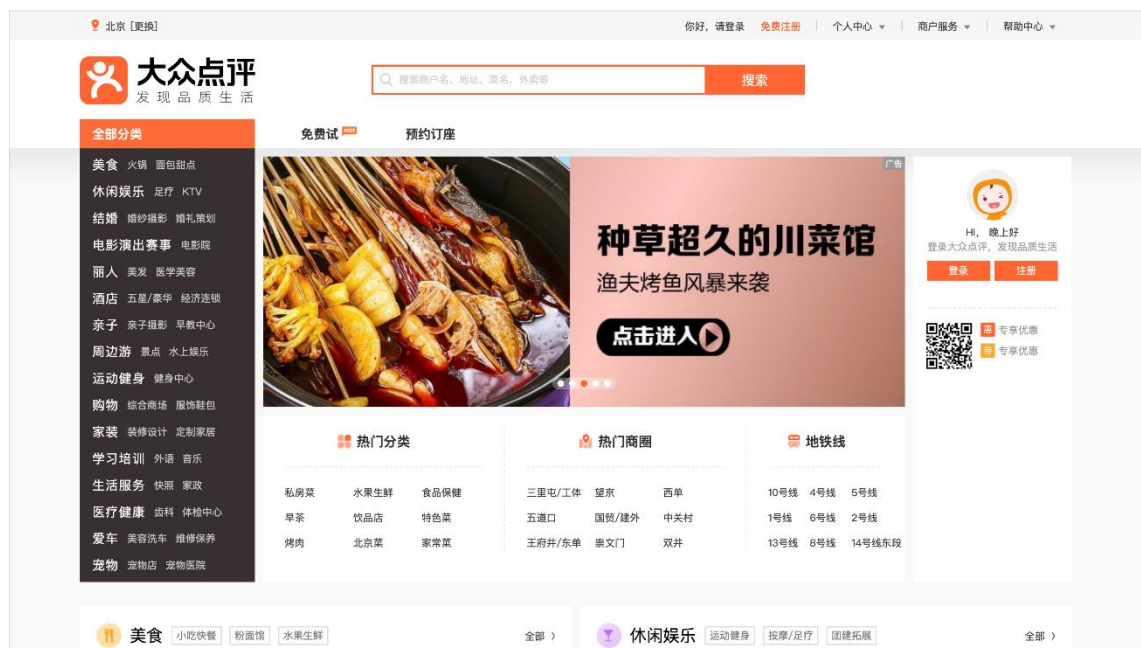


Figure 11: Example on vertical category listing on Dianping's front page

The websites analysed contained three different types of submenus: horizontal (see Figure 12), vertical (see Figure 13) and multi-column (see Figure 14). Horizontal submenus were indeed confirmed to be more common in Chinese websites than British websites. In fact, no British website had a horizontal submenu. Out of the submenus found on British websites, easily the more popular option was multi-column submenu (85.71%), while the remaining 14.29% of the submenus were vertical. In Chinese submenus, the distribution was clearly more even: 36.36 % was horizontal, 27.27 % was vertical and 36.36 % was multi-column. In total, 38.89 % of the British websites containing a global navigation bar also had a submenu. 55.00 % of the Chinese navigation bars had a submenu, making submenus a bit more common in Chinese style.

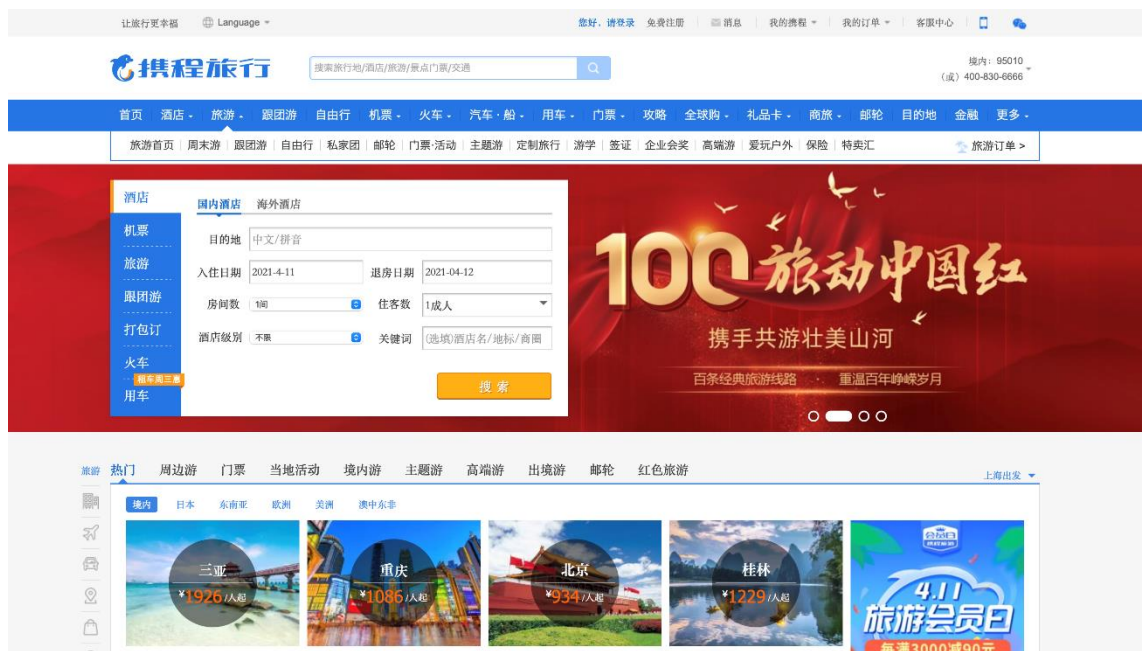


Figure 12: Example of horizontal submenu



Figure 13: Example of vertical submenu

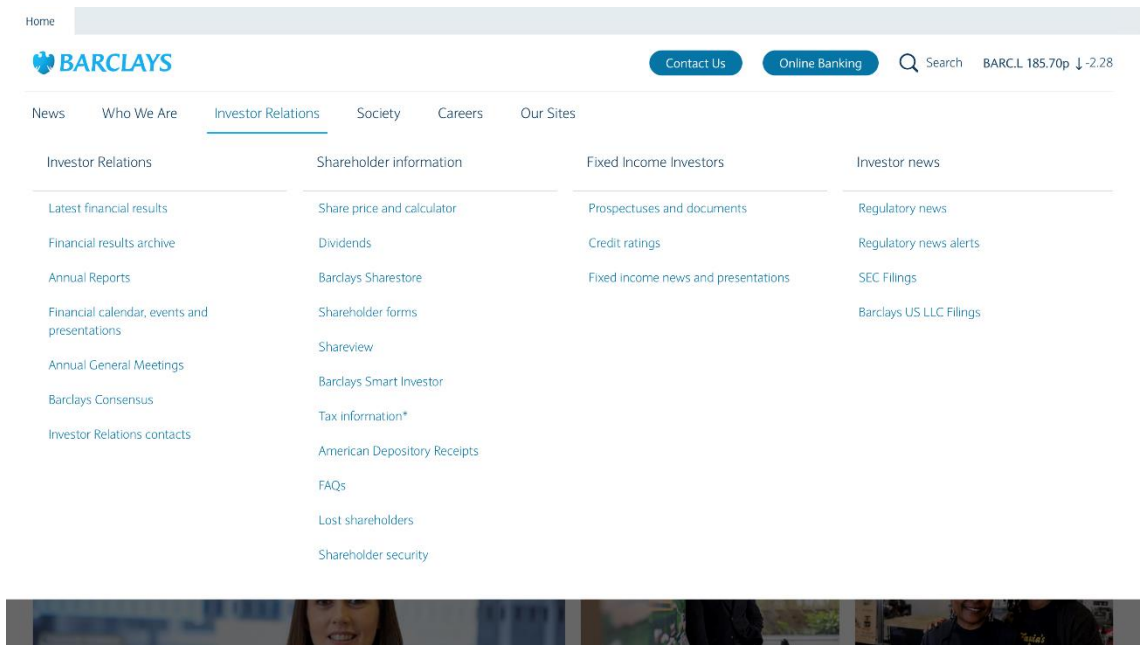


Figure 14: Example of multi-column submenu

The seventh and final hypothesis was about the length of webpages:

(RH7) Chinese webpages are shorter on average than British webpages.

This hypothesis was confirmed. The average page length for Chinese websites was 3.26 screen lengths (median 2.98). For the British websites, the average was 4.04 screen lengths (median 3.63), making the British websites 24% longer on average. It should also be noted that none of the pages included had actual infinite scrolling as the bottom was always to be found and with relative ease. The longest websites were 8,26 screens and 11,31 screens for China and the UK, respectively.

6. Analysis

After presenting the data collected and confirming or disconfirming the hypotheses in the previous chapter, this chapter analyses the reasons behind the results study and tries to examine what the results mean in a larger context. Each of the hypotheses are discussed separately in the order they were presented initially. This chapter has a similar structure to the previous chapter, dividing the hypotheses into three groups.

6.1 Typography

We can observe major differences in the use of fonts. Recalling the first hypothesis, the claim was:

(RH1) Chinese websites use a more limited collection of fonts than British websites.

The fact that many Chinese sites use the same fonts, with 70% using Microsoft YaHei, can be explained with the complexity of the Chinese writing system. Whereas the English alphabet consists of 26 characters, the Chinese writing system consists of thousands of logograms, i.e., characters that represent either a word or morpheme. In addition to this, the Chinese characters have two variations: simplified Chinese, chiefly used in mainland China, and traditional Chinese, which is used primarily in Taiwan and Hong Kong. Even considering that English requires an upper- and lower-case form for each character, the difference in the number of characters is enormous. Creating fonts for the Chinese language is thus a very tedious task, which does not encourage companies and designers to create their own fonts. In Western design, however, many brands have their own fonts as they are not overly difficult to create. Out of the British companies included in this study, Amazon, Dyson, Google, The Guardian, PayPal and Tripadvisor have their own proprietary fonts, which they use on their websites. Even if not using their own font, Western companies and institutes have a huge library of Latin alphabet fonts to choose from.

While creating a font for the Chinese language does require significantly more effort than creating a font for the English language, it is by no means impossible. *Smashing Magazine* writes that different fonts do exist, but they are not often used, due to being so huge in size. The font files are so big, they significantly slow down page loading times, thus possibly lowering user experience instead of enhancing it. The article writes of Youziku, a solution that tries to fix the problem of Chinese web fonts by grabbing the piece of text sent to it, rendering it using a different font and returning the resulting text. However, solutions like Youziku also have their problems. The article explains that this kind of workaround causes different kinds of issues like thin fonts not rendering well and slight visual stutter as the rendered text takes a little longer to load than the actual page. (Schaefer, 2015)

Using custom fonts for Chinese webpages without compromising the overall usability is not an easy task, whether using solutions like Youziku or not. However, using only a few fonts everywhere would definitely be limiting. Using some basic fonts like Microsoft YaHei for bigger texts that try to catch the user's attention would also result in a boring design, as Microsoft YaHei is a rather plain font meant primarily for body text (Figure 15). It is understandable that designers would want to use special fonts for bigger headings and the like. This can explain the fact that every single Chinese website in this study had text within an image. Having the required font just on the designer's own computer and adding the desired text inside an image enables the designer to use any font they want, but without the risk of decreasing user experience. Designers interviewed for *Smashing Magazine's* article agree.

It has been discussed why Chinese websites typically add text inside images. Yet, it is just as important to ask, why Western websites do not do this. While a definitive answer to this is impossible to give on a study like this, possible reasons can be speculated. For one, text that is added separately on top of an image always looks sharp regardless of the size of the image. This also makes scaling the website easier. For example, an image with small text might become unreadable when scaled to a mobile device. This can be prevented when the text is scaled separately from the image. Secondly, separate text on top of an image is relatively easy to change without having to update the whole image.

Considering that using unique fonts is not difficult for Western websites, there are no real drawbacks from using separate text on top of an image, only benefits.

英汉翻译之所以难

Figure 15: Microsoft YaHei

While it is now established why Chinese websites use less different fonts in general, it is noteworthy to consider that Chinese websites use on average two fonts per page, while British websites use mostly one. In fact, about 70% (17 out of 24) British websites use only one font. When looking at the fonts used on the Chinese websites, it needs to be noted that not all of them even support Chinese characters, such as Times New Roman. While different Western languages can easily use the same font, the same is not always true for Chinese and English, for example. Even though a font might support both Chinese and Latin-based writing systems, it does not necessarily mean that the website's designer wants to use the same font for both. It might be that one font is used for the Chinese characters and another for displaying English text, which can be found on most of the sites in one way or another. This switching of fonts may offer one explanation for why Chinese websites use on average more different fonts per site.

The second hypothesis claimed:

(RH2) The variation in font sizes is smaller in Chinese websites than in British websites.

As stated in the previous chapter, the fact that heading-level text is often included inside an image means that the number of font sizes used is actually bigger than what the results of this study state. Likewise, the difference between smallest and largest font should also be bigger.

The reason Chinese websites tend to prefer smaller font sizes in general than their Western counterparts might be related to the “busy feeling” many articles described getting from the Chinese websites. Alexander et al. (2017) also noticed this, naming it “high display density” and “high use of visible items in a webpage”. Even though not re-proven in this study, it should be noted that Chinese websites typically have a lot of content and a lot of text in a relatively small space. Using smaller font sizes, often 12, means being able to add even more text in the same small text box. Western websites on the other hand seem to prefer bigger font sizes and a lot of white space around text, creating an airy feel and namely avoiding the crowded look typical to the Chinese internet. Assuming that a “busy” feel is desirable in East-Asian web design, it can be argued that smaller font sizes are often used to cram more content in the same space.

As the Chinese websites had on average less variation in font sizes, and used 1 font size less per page, it should also be discussed, what this means for hierarchy on the webpage. Arguably the main reason for using different font sizes is creating visual hierarchy in the text and guiding the user’s eye. Smaller variations in font sizes mean that the differences between different levels of headers and body text are smaller. This could imply that there is a difference in how Chinese users and Western users scan a page, which is in line with Dong and Lee’s (2008) findings discussed previously.

6.2 Colours and movement

With respect to the use of colour, the third hypothesis claimed

(RH3) Chinese websites use a wider colour palette than British websites.

This claim got confirmation, since the Chinese websites use a wider colour palette than the British websites. This was truer in regards in regard to text than backgrounds. It needs to be remembered that, as stated in the previous chapter, the data collected on the use of colours is affected by the facts that some backgrounds especially on the Chinese example sites were images, so the colours used were not counted and that Babytree alone was so colourful it raised the average number of colours well above the median. For example,

Bank of China's website had only two background colours according to the data, yet their website seems significantly more colourful than one would think based on this (see Figure 16). The most extreme example of this can be said to be WeChat, as the navigation bar and the grey on the background are all just one background image (see Figure 17). However, considering that these facts would only increase the number of colours used on Chinese websites, it can be safely said that Chinese websites are indeed more colourful than their Western counterparts.



Figure 16: Bank of China's homepage



Figure 17: WeChat’s homepage

What comes to moving elements, the fourth hypothesis claimed

(RH4) Chinese websites feature moving elements (e.g., rotating banners) more often than British websites.

This claim got confirmation, since Chinese websites feature a lot more moving elements and animations than Western websites. In fact, all Chinese elements contained something that moved automatically without user input, while this was true for only 25% of British websites, making it a very prominent design element in China. It is not clear why it is so common, but it is possible that the Chinese companies want to utilise the available space as efficiently as possible. The movement also might help to create a feeling of busyness and having a lot to offer – something that Chinese companies often seem to try to achieve. Western companies on the other hand might be to avoid using features such as image carousels as they might create a feeling of restlessness. It also can be noted that image carousels are good for introducing many things quickly, but Western sites might want the user to focus more on one key thing instead of quickly glimpsing a lot of content.

6.3 Layout

Turning the attention to the layout, the fifth hypothesis claimed

(RH5) Chinese Websites feature vertical layout for global navigation more often or as often as horizontal layout.

Despite the assumption that the Chinese websites would sometimes feature vertical global navigation or even prefer it, none of the websites in this study had one. Vertical global navigation was specifically mentioned by Malachi (2017), who wrote that the Eastern market prefers vertical global navigation, while the Western market and Chinese websites using English prefer horizontal navigation. Malachi bases this claim on a study instead of just general feeling. However, the study in case is from 1997. In a rapidly changing field like web design, information from a twenty-year-old study can be critically outdated. Malachi also uses Starbucks as an example of this but fails to provide any other examples. The results from this study imply that Starbucks' website represents an exception rather than a common design. It is, however, easy to make such an assumption as logically thinking it makes sense, because the Chinese writing system is traditionally written from top to bottom and right to left. This is a reminder that blindly following intuition and applying little research might lead to poor design decisions.

The sixth hypothesis claimed

(RH6) Horizontal submenus are more common in Chinese websites than British websites.

Horizontal submenus on the other hand were proven to be relatively common in China, representing a third of all the submenus. This might also be explained with linguistic reasons. Horizontal navigation might work better with the Chinese language than with a Western language such as English, as Chinese language normally does not have spaces between words. This means that links listed horizontally can be distinguished from each other more easily than in Western languages such as English, where links might consist of several words with spaces between them. The links are also typically of more even lengths in Chinese than in English, which makes it easier to scan through the horizontal menu. Horizontal navigation makes it possible to have a submenu without the links falling

on top of other content below as in a vertical navigation, so it makes sense that the Chinese would make use of this possibility. As a final note, overall, the Chinese websites have more submenus. This contradicts the assumption made by Alexander et al. (2017), who claim that submenus are more common in Western countries than in China.

Finally, with respect to the length, the seventh hypothesis claimed

(RH7) Chinese webpages are shorter on average than British webpages.

Even though this claim got confirmation and the Chinese websites were found out to be on average around 80% of the length of the British ones, they are still longer than claimed at the article. The article estimates that Chinese websites are around two screen lengths, while the average length in this study is approximately three screen lengths. It is important to consider, though, that “screen length” is a vague measurement of page length. This study uses 1085 pixels as the definition of one screen length. However, as the article does not specify the size of one screen length, the result cannot be really compared to that, other than whether Chinese webpages actually are shorter than Western ones on average. It is also interesting to note that while the other article claimed that Chinese websites often feature infinite scrolling, none of the webpages analysed here has that feature. The article in question specifically mentioned QQ News as an example of this. QQ News also happens to be one of the websites analysed in this study, and even though it is among the longest webpages with the length of 5.49 screen lengths, it does not have infinite scrolling.

7. Discussion

Having now presented the empirical results and their analysis this chapter discusses their implications, acknowledges the limitations of this study, and suggests future research recommendations.

7.1 Implications

This study presents evidence that there are differences between Chinese and Western web design that can be proved. Some can be explained easily with reasons such as the writing system, while some are more deeply rooted in culture. Even though the number of websites analysed for the purpose of this study is a tiny portion of the websites that represent the cultures and their design styles, they represent many different types of websites. Combined with the fact that other works introduced in Chapter 3 have also produced similar results, it can be assumed that the results can be used to form general assumptions on the difference between Chinese and Western design styles. These results can be used as guidelines for Western designers when designing for Chinese audience.

With respect to the research questions listed in Section 1.1, we can provide the following answers:

(RQ1) How does Chinese web design differ from Western web design?

Based on the results from this study, there seems to be some aspects that can be measured. The results implicate that the typography, length of webpage, and use of colours, moving elements, and horizontal submenus is different depending on whether the website originates from the Chinese or Western culture.

(RQ2) Why do these differences exist?

The answer to this research question is not a simple and short one. Some of the design differences can be explained fairly simply with factors such as local language. However, some differences have roots in different mindsets and the general ways of thinking

between the Western and Chinese cultures. These mindsets have led people to make different design solutions. Eventually, people have gotten used to the way of doing things, leading into different ideas on what a UI looks like. This is again present in all new design produced within that culture.

Based on these results it can be said that designers designing cross-cultural interfaces should consider much more than just the language of the target culture. This is especially true, when significant cultural differences exist between the cultures, such as between China and the UK. In many cases to create a truly localised experience in the Chinese market, a Western company should design the Chinese version of their website separately from the Western version, and with the help of a local expert so they will not get stuck on the Western way of thinking.

As many of the hypotheses regarding the current state of Chinese design were confirmed, they can be used as general guidelines in cross-cultural design. However, the fact that some aspects discovered in literature could not be confirmed to be true for some reason or another serves as a reminder that the best way to create good UX is to test with local users as much as possible.

7.2 Limitations

The main limitation of this study is that the examined group is relatively small, yet the cultures researched are big and have a lot of variation even within themselves. The results can be generalised to some extent to form a broad overview of the typical differences between Chinese and Western web design. However, they should not be blindly believed to accurately represent all Chinese or all Western design. It also remains unclear, whether the same results could be produced with a different set of websites.

The setting in this study divides people into cultural groups based solely on their nationality. It must be noted that this is not the only way to divide people into different user groups, nor necessarily the best. For example, within Chinese users, there are endless subgroups based on features such as age, residence, familiarity with internet, education,

gender and so forth. This study attempts to find rules that apply to Chinese design in general, but in truth, there could be a lot of variation between the different subgroups within the Chinese culture.

Another thing to consider was already pointed out in Chapters 5 and 6. Counting only text colours and background colours does not represent the use of colours fully. Especially Chinese websites used a lot of background images as well as colourful images and advertisements as their content. To get completely accurate data on the use of colours, these would have to be taken into account.

7.3 Future research recommendations

In Chapter 2, the importance of mobile internet was already explained. It was noted that the Chinese internet users largely depend on mobile devices as their main source for internet, while the amount of people of using a smartphone as their preferred device increases globally. As this study is limited to desktop versions, it would be interesting to conduct a similar research with the mobile versions of the websites.

Another thing this study omits is acquiring qualitative data on how the actual users perceive the user interfaces targeted at them versus targeted at different cultural audience. This would shed more light on the question, whether Chinese users prefer different kind of user interfaces than Western users, or whether they are used to it. Although it can be quite safely assumed that people in general do not actively hate the design style typical to their cultural group, as it is so common, it is still unclear, what kind of style they would like best. As mentioned in Chapter 2, Romeo, Karreman and Li (2016) suggest that the Chinese value convenience over visual aesthetics. This could mean that while the users want to see a lot of content and a layout typical for the Chinese culture for convenience reasons, their aesthetic preferences might differ from that, creating a gap between what the users want to see and what works best for them. This is already seen in a way with the use of fonts. It can be assumed that the Chinese would like to use more different fonts, hence placing text in images, but cannot do so without risking the page to perform poorly, which results in a bad user experience.

One final note is that this study focuses solely on the current state of web design in the two cultures. This means that the results cannot be used to draw conclusions on how the web design styles will evolve in the future. However, this would be an interesting area for research and would provide great insight for designers. If there truly is a gap between how Chinese design is and how the users would prefer it to look like as stated above, the design style could be changing in the coming years due to advancing technology.

8. Conclusion

This thesis aimed to identify measurable differences between Chinese and Western web design through seven hypotheses on typography, use of colours, movement, navigation and length of webpages. These hypotheses were based on the differences existing studies and online articles have previously found between Chinese and Western design. To prove the hypotheses right or wrong, quantitative data was collected from 48 websites, half of which were British and half of which were Chinese.

The hypotheses and their conclusions were as follows:

(RH1) The variation in font sizes is smaller in Chinese websites than in British websites.
– Confirmed.

(RH2) Chinese websites use a more limited collection of fonts than British websites.
– Confirmed.

(RH3) Chinese websites use a wider colour palette than British websites. – True.

(RH4) Chinese websites feature moving elements (e.g., rotating banners) more often than British websites. – Confirmed.

(RH5) Chinese Websites feature vertical layout for global navigation more often or as often as horizontal layout. – Not confirmed.

(RH6) Horizontal submenus are more common in Chinese websites than British websites.
– Confirmed.

(RH7) Chinese webpages are shorter on average than British webpages. – Confirmed.

Based on these conclusions, it is clear that UX designers should do careful research of the target culture or cultures when designing for cross cultural websites. When designing for the Chinese market from a Western perspective, details such as these listed in this thesis should be taken into consideration. Even though further research is needed to

determine the exact causes behind some of these hypotheses, the data collected here works as a starting point and general guideline on how design differs between cultures.

There is also a lesson to be learned from the facts that hypothesis five was proven to be false and that even though hypothesis seven was proven to be true, the result was not exactly as in the original article. This emphasises the need for collecting data on the target culture before jumping into conclusions without proof.

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Appendix A: The data collected from British websites

Websites	Text				Colours			Movement	Navigation			Length	
	Number of different font sizes used	Body text size	Number of fonts used	Text in image	Number of colours used in total	Number of colours used in text	Number of colours used in background		Navbar		Search bar or icon	Page length in px	Page length in screens
								Global navigation bar	Number of links	Horizontal or vertical submenu			
Gov.uk	6	16	1		5	4	4				x	3281,24	3,02
HSBC	9	18	1		6	2	5				x	5427,19	5,00
Barclays	9	17	1		8	4	5				x	4963,52	4,57
WhatsApp	7	14	1		12	6	7				mc	2095,6	1,93
Burberry	5	16	1		4	3	2				x	12268	11,31
Google news	7	14	1		5	4	3				x	8795,2	8,11
The Guardian	7	16	2		10	7	6				x	5306,49	4,89
BBC news	6	14	1	x	6	5	3				x	4642,02	4,28
PayPal	10	16	2		8	6	4				x	3911,68	3,61
Amazon UK	6	13	1	x	15	10	6				mc	6314,4	5,82
British Airways	9	16	4		14	10	6				mc	4246,84	3,91
TripAdvisor	8	16	2		7	3	5				x	3354,4	3,09
Rolls Royce	4	14	1		3	3	2				x	3112	2,87
Aviva	6	16	1		10	6	6				x	4819,91	4,44
Bitdefender	6	16	1		6	6	3				x	1837,53	1,69
Costa coffee	6	18	2		5	3	4				x	3051,6	2,81
City of London	8	16	2		6	5	3				x	4537,35	4,18
Zomato	9	16	1		11	8	4				x	4297,41	3,96
Mumsnet	8	15	2		9	5	8				x	2823	2,60
University of Oxford	8	16	1		13	8	5				x	2775,29	2,56
University of Cambridge	8	16	1		5	5	4				v	3919,76	3,61
Dyson	8	16	1	x	8	4	5				x	3102,35	2,86
Google Play	5	13	1		10	5	4				x	3962,4	3,65
London Transportation	4	16	1		14	7	9				x	2381,2	2,19
24				3				6			18	7	20
Average	7,04	15,58	1,38		8,33	5,38	4,71				6,61	4384,43	4,04
Median	7	16	1		8	5	4,5				6	3941,08	3,63
Percentage				12,50 %				25,00 %			75,00 %	38,89 %	83,33 %

x = yes

mc = multi-column

v = vertical

h = horizontal

Appendix B: The data collected from Chinese websites

Websites	Text				Colours			Movement		Navigation			Length	
	Number of different font sizes used	Body text size	Number of fonts used	Text in image	Number of colours used in total	Number of colours used in text	Number of colours used in background	Carousel images, moving text, autoplay video	Global navigation bar	Navbar		Search bar or icon	Page length in px	Page length in screens
										Number of links	Horizontal or vertical submenu			
gov.cn	10	15	5	x	11	7	7	x	x	9	h	x	2928,4	2,70
Peoples Bank of China	4	12	3	x	12	7	6	x	x	38		x	2541,8	2,34
Bank of China	5	12	3	x	8	6	2	x	x	8	mc	x	2913,2	2,68
WeChat	5	14	1	x	7	6	1	x	x	9			1020,2	0,94
Bosideng	6	13	1	x	8	6	2	x	x	5	v	x	4439,2	4,09
QQ news	6	16	1	x	12	10	3	x	x	17		x	5961,6	5,49
Sohu	6	16	2	x	12	9	4	x	x			x	8969	8,26
XinhuaNet	6	16	1	x	12	8	5	x	x	13		x	4416,8	4,07
Alipay	3	12	1	x	7	5	4	x	x	5				
Taobao	6	12	4	x	15	13	4	x		0		x	3379,2	3,11
Air China	6	12	2	x	8	6	3	x	x	8	mc		1682,4	1,55
Ctrip	6	12	4	x	17	12	7	x	x	18	h	x	4291,56	3,95
SAIC Motor	3	12	2	x	5	4	2	x	x	6			1702,47	1,57
China Life	9	16	1	x	10	6	6	x	x	8	h		3081	2,84
360	6	13	1	x	8	6	3	x	x	11	mc	x	3161,2	2,91
luckin coffee	5	12	2	x	9	8	3	x	x	6			1085,6	1,00
Beijing	9	14	2	x	16	12	6	x	x	5	h	x	4170	3,84
Dianping	6	12	1	x	15	6	10	x	x	0		x	4283,4	3,94
Babytree	4	12	1	x	32	22	11	x	x	10		x	3311	3,05
Tsinghua University	8	12	5	x	7	5	2	x	x	8	v	x	4359,79	4,01
Peking University	6	14	2	x	9	4	7	x	x	7		x	8705,36	8,02
Huawei	10	16	1	x	10	7	5	x	x	5	mc	x	4456,1	4,10
Tencent My App Store	4	12	1	x	9	8	3	x	x			x	2565,6	2,36
Beijing Subway	5	12	2	x	12	10	3	x	x	8	v	x	1474	1,36
24				24				24	20		11	18		
Average	6,00	13,29	2,04		11,29	8,04	4,54			9,27			3691,26	3,40
Median	6	12	2		10	7	4			8			3311	3,05
Percentage				100,00 %				100,00 %	83,33 %		55,00 %	75,00 %		

x = yes

mc = multi-column
v = vertical
h = horizontal

Appendix C: Fonts used on British websites

Website	Fonts				
Gov.uk	nta				
HSBC	UniversNext				
Barclays	Expert Sans				
WhatsApp	-apple-system				
Burberry	Styrene				
Google news	Google Sans				
The Guardian	Guardian Text Sans Web	Guardian Egyptian Web			
BBC news	Helvetica				
PayPal	PayPalSansSmall	PayPalSansBig			
Amazon UK	Amazon Ember				
British Airways	mylius-modern	Roboto	Helvetica	open-sans-v15-latin	
Tripadvisor	Trip Sans VF	Georgia			
Rolls Royce	Riviera Nights				
Aviva	source_sans_pro_vf				
Bitdefender	Roboto				
Costa coffee	Brandon Grotesque	Gotham			
City of London	Oxygen	Helvetica			
Zomato	Okra				
Mumsnet	Roboto	Fira Sans			
University of Oxford	PT Sans				
University of Cambridge	Lato				
Dyson	DysonFutura				
Google Play	Roboto				
London Transportation	Johnston100				

Appendix D: Fonts used on Chinese websites

Website	Fonts				
gov.cn	F2YouHK_512B	gowwf_fzzhunysk_ys_1249	F22HUNYSK	Microsoft YaHei	
Peoples Bank of China	宋体	YaHei	Microsoft YaHei		
Bank of China	Verdana	Microsoft YaHei	宋体		
WeChat	-apple-system-font				
Bosideng	Microsoft YaHei				
QQ news	Microsoft YaHei				
Sohu	PingFang SC	Arial			
XinhuaNet	PingFang SC				
AliPay	Microsoft YaHei				
Taobao	LantingHei SC	Arial	Microsoft YaHei	Tahoma	
Air China	Microsoft YaHei	Arial			
Ctrip	Microsoft YaHei	Arial	Times New Roman	Tahoma	
SAIC Motors	Arial	Microsoft YaHei			
China Life	LTZhH				
360	Arial				
luckin coffee	HelveticaNeue	PingFang SC			
Beijing	Microsoft YaHei	Arial			
Dianping	PingFang SC				
Babytree	Arial				
Tsinghua University	Raleway	Microsoft YaHei	Microsoft JhengHei	EB Garamond	
Peking University	Microsoft YaHei	Arial			
Huawei	Microsoft YaHei				
Tencent My App Store	Microsoft YaHei				
Beijing Subway	黑体	Simhei			