

# Web Design and Usability Issues: How people read Webpages

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Thesis

Business Information Technology

2014



# Abstract



21 November 2014

Degree programme in Business Information Technology

Author or authors	Group or year of			
Petra Bacso, Diego Quintanilha Miranda Pereira	entry			
	2011			
Title of report	Number of pag-			
Web Design and Usability Issues: How people read Webpages	es and appen-			
	dices			
	99+59			
Teacher(s) or supervisor(s)				
Jari Hyrkäs				

The purpose of this research is to define and analyse how people read webpages, on desktop computers and mobile devices, and give valuable advice to what to do and what to avoid when designing for the web. This is not a technical usability guide, but more a collection of information that ought to be taken into consideration when designing websites with a special focus on business.

The study has been carried out with help of literature research about various eyetracking and web usability studies, done in the field of web design, and practical user tests to validate that theoretical background. It shows how users interact with webpages such as where they start browsing, how much they read, what content they concentrate most on and what drives them away.

All of the studied researches agree on that there is a certain pattern on how people scan through webpages. This pattern can be clearly seen in Jacob Nielsen's eye-tracking study displaying an F-pattern, meaning the users scanned through the content starting from the upper-left corner. Some researchers find cultural differences in how people read web content, but the truth remains the same: the upper and the left part of the page is looked more thoroughly. This means that the most important information that we want to give the user should always be on the top-left part of the page and the less important information should go to the bottom of the page.

The online readers should be kept in their comfort zone by keeping in mind where certain elements are expected to be, in order to enable smooth web browsing. Mobile users look for lean text and content that helps them to accomplish tasks efficiently. Any kind of advertisement is seen as an annoyance and can easily make a website look unprofessional. Consistency and simplicity should remain uniform throughout the page.

# **Keywords**

Research, desktop, mobile, eye tracking, web, usability, heuristics

# Table of contents

1	Intr	troduction				
	1.1	Resea	rch background	1		
	1.2	Resea	rch problem	2		
2	Obj	Objectives and deliverables				
	2.1	Deliv	erables and scope	3		
3	Rese	earch n	nethod	4		
	3.1	Desci	ription of the research method and data	4		
	3.2	Ratio	nale of the method	5		
	3.3	Work	division	5		
4	Terr	minolo	gy	7		
5	Hov	w peop	le read webpages	9		
5.1 How people read web content on desktop		How	people read web content on desktop computers	9		
		5.1.1	Images and advertisements	14		
		5.1.2	Page fold and scrolling	16		
		5.1.3	Call to action and buttons	19		
		5.1.4	Text and white space	21		
	5.2	How	people read web content on mobile devices	23		
		5.2.1	Content complexity in mobile devices	29		
		5.2.2	Designing for mobile devices	31		
		5.2.3	Business-to-consumer website for mobile devices	35		
	5.3	Psych	nological aspect of web design	37		
	5.4	Cultu	ral differences in web design	39		
		5.4.1	Images	41		
		5.4.2	Colours	42		
6	Webpage design and analysis		45			
	6.1	Google search engine4		45		
	6.2	Amazon4		49		
	6.3	eBay5				
	6.4	Designed e-commerce test website				
		6.4.1	Test website for desktop computers, smartphones and tablets	61		

	6.5	Testing and evaluating	64
		6.5.1 Usability testing – desktop computers	68
		6.5.2 Usability testing – mobile devices	71
		6.5.3 Heuristic evaluation	74
	6.6	Analysing cultural differences	81
7	Rese	earch results	84
	7.1	Result findings for desktop computers	84
	7.2	Result findings for mobile devices	87
8	Furt	her research	89
9	Con	clusions	90
R	efere	nces	93
A	ppen	dices	100
	App	endix 1. Google Search Engine desktop computer with search word	100
	App	endix 2. Google Search Engine smartphone with search word	101
	App	endix 3. Google Search Engine tablet with search word	103
	App	endix 4. Amazon desktop computer without search word	105
	App	endix 5. Amazon desktop computer with search word	106
	App	endix 6. Amazon smartphone without search word	109
	App	endix 7. Amazon smartphone with search word	112
	App	endix 8. Amazon tablet without search word	116
	App	endix 9. Amazon tablet with search word	118
	App	endix 10. eBay desktop computer without search word	123
	App	endix 11. eBay desktop computer with search word	126
	App	endix 12. eBay smartphone with search word	130
	App	endix 13. eBay tablet without search word	134
	App	endix 14. eBay tablet with search word	141
	App	endix 15. Test website for desktop computers	151
	App	endix 16. Test website for smartphones	152
	App	endix 17. Test website for tablets	154
	App	endix 18. Crazy Egg click map	155
	App	endix 19. Crazy Egg scrolling map	156
	App	endix 20. Test questionnaire for desktop computers and mobile device	s157

# 1 Introduction

Sir Tim Berners-Lee, who was also the creator of the World Wide Web (www), wrote the first ever website in 1990. Three years later, in 1993, the website would be available for anyone to use. Since that time, the web has grown immensely and the world has never been the same. (W3C 2014.)

# 1.1 Research background

The Internet is part of people's daily lives nowadays, and virtually all kinds of products and services available have at least one website about it or the company producing it; in fact, the total number or websites doubled from 2011 to 2013, and the billionth website was estimated to have been created in September 2014, even though only about 25% of this number corresponds to active websites – the remaining 75% are reserved for future use. (Internet Live Stats 2014a.) Also, it is estimated that the user number three billion will be online by the end of 2014. (Internet Live Stats 2014b.)

With the popularity of Wi-Fi, together with faster mobile networks and technology improvements, smaller and lighter devices are adopted by more and more people as one of the ways they use to access the Internet; according to StatCounter (2014), mobile devices accounted for 22.16% of all web hits made by December 2013.

This study has the objective of researching how users read business-to-consumer (b2c) web pages, as well as Google search engine results page (SERP), develop a sample b2c home page and run tests to analyse users' perceptions of it. Based on those findings, the research study will present models of how those users believe a functionally attractive website should look like on desktop/laptop computers and on mobile devices. Furthermore, existing sites like Amazon, eBay and Google will be analysed with the help of findings from the theoretical part of this research study.

This thesis is completed as a pair work, where each author is accountable for specific parts of this research; the list of responsibilities of each author can be seen on chapter

3.3. As a remark, such list represents where each author has worked the most, though the other author might have contributed to the other topics on a smaller scale, as well.

# 1.2 Research problem

Although web design is linked to graphic design, it goes much deeper into the technological aspect of designing, as web design is a combination of graphic design and interlinked hypertext with a special focus on usability and how people read webpages. There are many points every web designer should keep in mind, and it all starts with knowing the target audience. User experience, which describes all interactions and feelings a user has while navigating on a website, is especially important when designing for businesses, since this will be the face of the company online and it can make or break a company that tries to offer their products or services.

Usability is a part of user experience and, according to Steve Krug on his book Don't Make me Think, Revisited (2014, 9), something is considered usable when someone of average "ability and experience can figure out how to use the thing to accomplish something" without much difficulty. Therefore, it is very important to have the right balance of usefulness and usability. Usability testing is a crucial step into professional web design in order to evaluate user experience and, therefore, reducing the risk of business failure.

Lately, more and more usability researches have been made to strengthen web usability and there are a number of testing tools available, eye-tracking technology being one of them and, by far, the most used.

Usability is not only about following rules, and although many books have been written over the years stating some basic rules about designing webpages, it is important to take these into account as guidelines rather than rules. They, however, all agree on one rule of thumb: people don't like to read online content; instead, users skim the pages reading highlighted keywords, headings and end up scrolling only about 50-60% of a page (Kollin 2013). Users are on the web trying to get something done, as fast as possible, so they don't need to read the whole page (Krug 2014, 22).

This research aims to get a better understanding of how users read web content and, with that information, provide ideas for web designers and developers towards creating more user-friendly websites. Webpages must be designed to enable users to quickly identify and find what they are looking for, not to overwhelm them with content that is overcrowded or difficult to read. And how can we achieve the correct use of colours, pictures, spacing and typography if we do not know how the audience will look at our content?

Furthermore, because there is so much information and content on the Internet today, people can easily find what they need in different locations. This leads to that if a webpage is not intriguing or easily usable, people can at any moment change to a substitute page. This is a big problem for companies that try to promote their products or services online, and this is exactly the reason why webpages need to be easily usable and straight to the point.

# 2 Objectives and deliverables

The research problem and objectives intend to show that web design should not only be based on the preferences of the designer or the business in question but, more importantly, on the audience.

In the business world, companies' online presence can make or break businesses, depending on how pleasant and easy-to-use their websites are. This research study's results will provide ideas that developers can use to create websites or improve existing ones, so that they catch the web users' eyes and make them stay on such pages.

# 2.1 Deliverables and scope

The objective of this thesis is to present how users read web content in different cultural environments and give valuable guidelines on how to create a user friendly and attractive business website. The deliverables will consist of a sample b2c website that works both in desktop/laptop computers and mobile devices, and run tests with users on this sample website and also on Google's search engine result page.

Included in this research are purely business-to-consumer-oriented websites, as well as the search engine result page (SERP) Google. This study aims for an insight of what works and what is misleading to, or even ignored by, the user. The mobile environment has also been added to this research study due to the current lack of researches analysing both environments at once.

It is not in the scope of this research to analyse social media, personal or artistic websites – e.g. pages containing galleries of pictures or video playlists, and neither are websites with main focus on entertainment, blogs or websites designed purely for private purposes. Business-to-business (b2b) websites, news and entertainment portals are excluded as well from the scope of the thesis, and search engines other than Google will not be analysed. Also, this research is not a usability technical guide. The sample website will be optimized to be accessible also on mobile devices, and no mobile applications will be developed or analysed in this thesis.

# 3 Research method

The data for this report is a combination of literature research and user tests to validate the theoretical background. A sample website was created based on theories studied in this research, and the testing was made by using usability tests and heuristic evaluation, as well as a click-tracking system developed by Crazy Egg to spot users' clicking points on the testing website. Existing business-to-consumer websites and Google's search engine are also analysed in the practical part of this research.

#### 3.1 Description of the research method and data

The material for this research was gathered from dissertations and scientific articles, including one of the biggest eye-tracking studies made to date. All sources were collected through books and online searching with search engine result pages and contain information about eye tracking and how people read web content.

The sample business-to-consumer website was designed based on the theories presented in this research. Usability tests and testing questionnaires about the website were performed by testing subjects, and heuristic evaluation was created with the results of the usability tests. Heat maps of the clicking behaviour of users visiting the sample website were also collected, with the use of a click-tracking tool. The usability tests' results, along with heuristic evaluation and heat maps, have the objective of validating or disproving the theoretical part.

#### 3.2 Rationale of the method

Literature research was chosen for this research, as it gives a wider perspective of the area, while saving time and resources. Another benefit for this method is that many different views and angles can be included into the research study.

The sample business-to-consumer website has the purpose of putting into practice the guidelines presented in the theoretical background of the research. With the aid of usability tests and testing questionnaire answered by test subjects, the guidelines can then be validated or disproved, according to the testers' feedbacks. Heuristic evaluation was also performed, in order to point out the problems users have encountered during the usability tests with more clarity.

#### 3.3 Work division

This thesis has been done as pair work and the workload was divided equally between both of the thesis authors. Petra Bacso has been researching desktop computers while Diego Quintanilha Miranda Pereira was in charge of researching mobile devices; the remaining chapters concerning introduction, objectives and methods were divided between both of the authors. Below is presented an exact list of the work division.

#### Petra Bacso

Theoretical background workload:

- Terminology
- How people read websites from desktop computers

- Cultural differences in reading websites
- Psychological aspect, why people read webpages the way they do.

# Empirical background workload:

- Designing an e-commerce website with Photoshop
- Analysing Google's search engine and existing e-commerce websites for desktop computers
- Conduct testing with desktop computers
- Elaborating usability testing and heuristics evaluation for desktop computers
- Analyse questionnaires' test results for desktop computers
- Analysing existing websites for cultural differences
- Writing results for desktop computers
- Writing conclusions for desktop computers.

# Diego Quintanilha Miranda Pereira

# Theoretical background workload:

- How people read websites on mobile devices
- Cultural differences in reading websites.

#### Empirical background workload:

- Coding and optimizing the test website for desktop computers and mobile devices
- Analysing Google's search engine and existing e-commerce websites for mobile devices
- Conduct testing with mobile devices
- Elaborating usability testing and heuristics evaluation for mobile devices
- Analyse questionnaires' test results for mobile devices
- Analysing existing websites for cultural differences
- Writing results for mobile devices
- Writing conclusions for mobile devices.

# 4 Terminology

This chapter strives to explain in more detail what key terms like web design, usability issues and how people read webpages mean and why they are important for this study. Furthermore, it contains descriptions of various testing methods, such as eye tracking, visibility metric, heuristic evaluation and usability testing.

# Click tracking

Click tracking is a way to track users' mouse clicks on a website. It records what exactly has been clicked and what has been ignored, which in return helps the designer to improve the effectiveness of a webpage. The results are often displayed with heat maps, making it easy to visualize how users have been interacting with a specific website (Crazy Egg 2014). The heat maps with the results for this research study can be found in chapter 6.5.

#### Eye tracking

Eye tracking dates back to 1879, when Louis Emile Javal realized for the first time that people do not read continuously through a page. Edmund Huey, author of the book "The Psychology and Pedagogy of Reading", went on and developed the first ever eye-tracking device. Such devices track web users' eye movements while browsing through web content and the results are often displayed as heat maps. Eye-tracking devices advanced over the years until 2001, when Tobii Technology developed an eye-tracking device that not only helps web developers in usability testing, but also allows disabled people to control devices with their eyes. (Leggett 2010.)

# Heuristic evaluation

Heuristic evaluation is a great tool to uncover usability problems at an early stage, giving developers recommendations for design improvements. A list of pre-written tasks is given to the test subjects and the test results are evaluated and analysed. Heuristics tend to uncover minor issues, making it essential to combine it with usability testing for more significant usability results. The method used for this research testing was developed by Jacob Nielsen and Rolf Molich. (Sauro 2012.) The rationale guidelines used have been

implemented by Weinschenk and Barker (Sauro 2011). The heuristics evaluation results can be found in chapter 6.5.

# How people read webpages

How people read webpages represents the way people interact with a website; what they expect to find at a given page, what draws their attention the most, how easy it is for users to perform tasks such as online shopping, on a website, etc. Understanding how people read online content is to understand about human behaviours; it is as much about psychology as it is about technology. (Turk 2014.)

# Responsive design

Responsive web design is a method in which the design and development of webpages should respond to different screen sizes, orientation and platforms and automatically adjust to the environment. The approach is a combination of adaptable layouts, images and CSS queries that will be triggered depending on the device accessing the website. For example, a website being accessed on desktop will present the page in its entirety, with large images and controls; when accessing the same page on a mobile device, it will automatically change to fit a lower resolution, reducing image sizes and/or omitting functionalities that are not essential for the users. (Knight 2011.)

#### Usability issues

Usability issues are the problems users might face while browsing through a website. It defines the ease of use of and the efficiency of websites. Within this large quantity of pages to choose, it is natural to think about one important aspect when it comes to users' satisfaction: the perceived quality of those websites. On the web, usability is vital for any successful business website. If a website is difficult to use, people will move on to another more accessible page. (Ismail 2012, 27.)

# Usability testing

Usability testing is important because it can detect problems that users experience at an early stage. The users are given various tasks to complete over a short period of time, after which the test results are analysed and evaluated. There are many ways to test usa-

bility; for this thesis, the testing method used is from Soren Lauesen's book, User Interface Design. (Lauesen 2008, 417.) The usability tests results for desktop computers and mobile devices can be found in chapter 6.5.

### Visibility metric

Visibility is a metric used by Clicktale for usability testing; it measures how web users interact with a website and how far they scroll down on a webpage. The specific location until where the user has scrolled is called the scrolling reach and is displayed in percentages or pixels. (Clicktale 2007a.)

#### Web design

Web designing is the process of creating online content like websites or an interface on the web that provides information – in other words, the front-end of a website. Designing web content involves graphical designing and programming codes like HTML (Hyper Text Markup Language) and CSS (Cascading Style Sheets). HTML and CSS are a combination of computer languages that define the code written behind a website. (Techterms 2013.)

# 5 How people read webpages

This part of the research contains detailed information on how customers look at business e-commerce websites, including Google's search engine, on desktop computers and mobile devices. Every company and designer involved in structuring a business website might think they know best what a professional site looks like to their customers, but is that really the case? This part of the research contains results from various literature studies and it shows in detail how users really look at websites, why they look at web content the way they do and what works best for the audience.

#### 5.1 How people read web content on desktop computers

This chapter describes how people read e-commerce websites and Google's search engine on desktop computers. It explains how images and advertisements affect the web user as well as how far the user scrolls down the page. It also gives information about

buttons, plain text, white space and the call-to-action bar, which often consist of important features like shopping cart and user account.

One of the biggest eye-tracking research studies was made in 2006 by Dr. Jakob Nielsen and Kara Pernice and it strives to explain in detail how customers see a business website. This is one of the most important questions when doing business on the Internet, and it is also one that the majority does not know how to answer. The method used for this research was eye tracking web technology.

The researchers studied how 300 test participants with a working background, aged 18 to 64 years old, read and comprehended hundreds of different websites. The websites used for these tests were all in English language. In addition to completing their own tasks, people were asked to attempt some of the previously prepared tasks, 85 in total, ranging from very specific to very broad activities. The researcher sat in the same room with the participants and observed their screens in real-time using an external monitor; each of the 1.5 million eye fixations captured were analysed. (Nielsen & Pernice 2006, 22.)

The research study observed that the test participants' reading behaviour was quite consistent over the numerous tasks that were completed. The study presented their findings with heat maps that many times showed a distinctive F-pattern. Heat maps are visualizations of gaze points, meaning that users' eye movements were tracked and displayed with colours. The test participants first started to look at the horizontal, upper part of the websites, then slightly moved down the page, and again read across the webpage in a horizontal movement. Finally, the content on the left side was scanned by users' eyes in a vertical movement. (Nielsen 2006.)



Figure 5.1. Business to customer website on the left and Google search engine on the right. (Nielsen 2006)

Figure 5.1 shows two heat maps from two different websites taken during the study: an e-commerce page and Google's search engine result page. Heat maps display red, yellow and blue colours, making it easier to see where people spend most time while looking at a website. Red areas are where the test participants focused the most on, and yellow areas indicate fewer views. Blue areas got very little viewer attention, while grey areas were not seen at all. (Nielsen 2006.)

Figure 5.2 shows a heat map from a similar study, but with only 50 participants, made by search marketing firms Enquiro, Did-it and Eyetools in 2005 and 2011. Google's search engine was used as a test subject, and a very similar F-pattern, also called the Google Golden Triangle, can be seen. (Everdell 2011.)

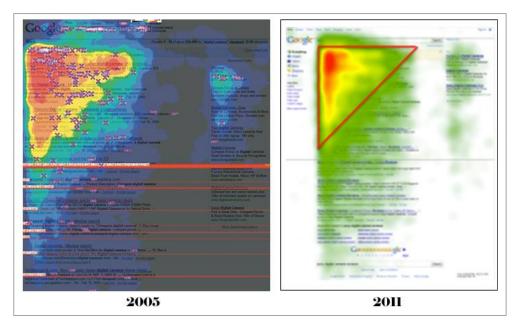


Figure 5.2. A comparison of the study made by Enquiro from 2005 and 2011. (Everdell 2011)

Enquiro discovered the Golden-triangle for the first time in 2005 and, in order to see if people scanning behaviour change over time, has since then made similar studies every year until 2011. As seen in figure 5.2, little or no changes on how people look through Google's search engine through the years can be seen. (Everdell 2011.)

The research study made by Nielsen and Pernice also shows that people behave in a slightly different, more direct way, when they search for images (Nielsen 2006). People decide within seconds if the website they are currently looking at is of interest or if what they see looks too complicated and they switch to another website instead (Nielsen & Pernice 2006, 289).

The biggest problem designers face when designing business to consumer websites is that the clients' marketing department, upper management and others might all have some input to what should or should not belong on the homepage. All parties involved in decision making often think that they know best what content is most important and, for that very reason, webpages are sometimes overfilled with content that makes the user rather confused. It is not easy for a designer to decide which content belongs on the page in order to keep it clean, clutter-free and at the same time make it clear to all the parties involved. (Nielsen & Pernice 2006, 67.)

Figure 5.3 is a very good example of an e-commerce webpage for a clutter-free homepage and it shows that the users scanned through even the less likely areas of the page; almost no content was ignored (Nielsen & Pernice 2006, 236).

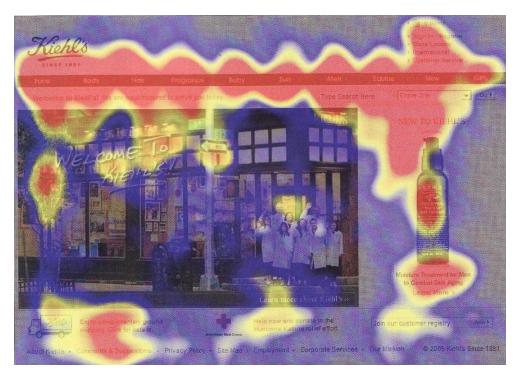


Figure 5.3. The users looked at most of the content of this clutter-free e-commerce webpage. (Nielsen & Pernice 2006, 236)

An e-commerce website should have pictures to the items displayed for sale, and even the smaller size images should be clearly visible. People remember images better than words and it helps them sort through content. The online shopper often wants to be able to zoom in to the image for a close-up view in order to make sure that this is the right product and so ensure the purchase; therefore, only good quality product images should be used. Figure 5.4 shows how the research participants scanned through an e-commerce website looking at the small product pictures as well as at the same, larger version. (Nielsen & Pernice 2006, 289-296.)



Figure 5.4. The users looked at the small product images as well as at the bigger zoomed-in picture. (Nielsen & Pernice 2006, 290)

# 5.1.1 Images and advertisements

Images play a huge role in e-commerce and can differ from having a very positive user experience to being very confusing and frustrating. If the image of a product is similar to other images displayed on a website, users start to spend more time on the text written next to the products in order to get more information. (Nielsen & Pernice 2006, 290-291.)

Another interesting case study, conducted in 2009 with 200 test participants by Think Eye Tracking for Sunsilk, shows how images can redirect online shoppers' eyes towards or even away from the product. Think Eye Tracking had been conducting these kinds of studies for many years and for several different brands, the results being always the same. Figure 5.5 shows two almost identical pictures, except from the eye direction of the lady displayed in the picture. The picture with the lady looking at the Sunsilk product got 84% of views on the product itself, while the picture with the lady looking away from the product got only 6% of views on the product. (Maughan 2009.)





Figure 5.5. The lady is looking at the product on the left and on the right she's looking away from the product. (Maughan 2009)

Advertisements or images that look like advertisement are often seen as disturbance, or even ignored by the user. The best approach to integrate advertisements into a Website is to make them look like they belong to the content of the page and place them in a strategic position. (Bergstrom & Schall 2014, 250-251.) However, caution is advised when it comes to unethical adverts; they might at first attract more fixations but will, in the end, work against a healthy and ethical business relationship by misleading the user. (Chapman et al. 2012, 67-68; Nielsen & Pernice 2006, 283.)

A product image of an e-commerce website could be mistaken by the online shopper as advertisement if it looks like it does not belong to the rest of the page by either a different colour or a highly formatted text. Figure 5.6 shows a good example of how the right side of the Pioneer website was almost completely ignored, because the test subjects mistook the product images displayed as advertisement. (Nielsen & Pernice 2006, 283-284.)

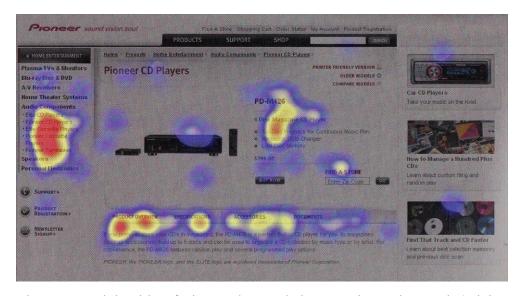


Figure 5.6. Right side of Pioneer b2c website was almost ignored. (Nielsen & Pernice 2006, 284)

### 5.1.2 Page fold and scrolling

Many researches and usability studies from the mid-nineties had stated that people do not like to scroll down and read past the fold; this led to web designers squeezing all possible content into the above-the-fold part of a webpage, making it very unclear and hard to read for the user. Page fold is the part of the website a user can see without scrolling down. As this statement was true in older studies, computer screens have become much bigger in today's world and user behaviour has changed.

In 2007, Clicktale made a study based on thousands of websites and over 80000 page-views while analysing scrolling behaviour. The tracking method used for this study was a metric called visibility, analysing visual perception of humans. It counts page height in pixels and measures until where the test users have reached while scrolling down in percentages. Different sizes of screens were used during this research – the web content above the fold ranged between 430 and 860 pixels. Figure 5.7 indicates that in average 15% – 20% reached the bottom of the webpage, regardless of the absolute height of the tested webpages. The page fold in the graph starts at 500px. (Clicktale 2007a.)

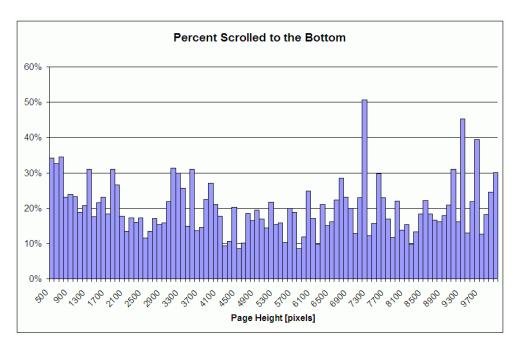


Figure 5.7. Clicktale scrolling research report. (Clicktale 2007a)

The research also focused on the attention span of the users and concluded that the most valuable content of a webpage should be located between 0 and 800 pixels; the attention span started to decline after the 540 pixels line (Clicktale 2007b).

Chui Chui Tan from Cxpartners conducted a series of eye-tracking studies in 2008 about what people see before they buy products, and so gave valuable guidelines to web designers. The research studied ten e-commerce websites from the United Kingdom, with eight test participants, and concluded that it all depended on the length of the webpages. Figure 5.8 displays two very long e-commerce websites; the grey areas on the bottom of the pages show no user attention, which means that only two-thirds of the web content was seen by the test participants. (Chui Chui 2008.)



Figure 5.8. What people see before they buy. The grey area on the bottom had no fixations, therefore was not seen by the users. (Chui Chui 2008)

#### 5.1.3 Call to action and buttons

The call-to-action bar is the element of a website where users can find, for example, their shopping basket or checkout button. It is one of the fundamental elements of an ecommerce business website and should be clearly visible and easy to use. Test participants of Chui Chui Tan's research study explained how the add-to-basket function of an ecommerce website shown in Figure 5.9 was confusing because Tesco Direct displayed a small arrow, instead of a larger add-to-basket button as the test users would have expected. (Chui Chui 2008.)

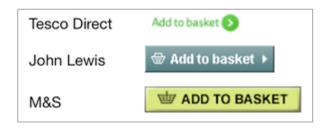


Figure 5.9. Tesco Direct displays a small arrow button, while John Lewis and M&S display a larger add-to-basket button. (Chui Chui 2008)

It is very important, especially for online e-commerce businesses, to make it clear for the user where to click and what is clickable. If the online buyer needs to think too much about where to click in order to make a purchase, chances are the business transaction will not happen at all. Figure 5.10 shows an example of a button that is confusing to the user, because instead of pointing towards the clickable text, it points away. Figure 5.11 demonstrates where the arrow should be placed instead, to make it clear that this is the place to click in order to search for a product. (Krug 2006, 37-38.)



Figure 5.10. The arrow is pointing away from the text to be clicked. (Krug 2006, 38)



Figure 5.11. The arrow is pointing towards the text to be clicked. (Krug 2006, 38)

Figure 5.12 shows results in form of two graphs from test participants that were asked to find common webpage elements, such as shopping cart and search field. Nielsen called it the rapid-fire task, where users first were asked to find the call-to-action bar when opening the website and complete the action. The graphs are presented by eye fixations; this means that the very first time the test users looked at the website, 50% searched for the elements in the upper right corner of the page and 44% looked at the upper left corner. The results suggest that the best place to put the call-to-action bar is in the upper part of a website, preferably at the right corner. (Nielsen & Pernice 2006, 160.)

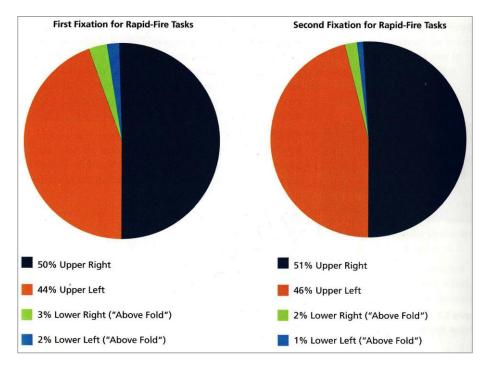


Figure 5.12. Two fixation charts results for finding common webpage elements. (Nielsen & Pernice 2006, 161)

# 5.1.4 Text and white space

White space, also called negative space because it does not necessarily have to be white, gives the overall layout a clean and easy-to-read feeling. While web users do not read smoothly, white space can guide them while scanning through a website, creating a nice balance throughout the page. Users also tend to jump over words or jump front and back to re-read, depending on what information they are currently seeking. (Bergstrom & Schall 2014, 164, 173-174.)



Figure 5.13. Two pictures with the same content, the left one has less white space. (Boulton 2007)

White space is not only important for plain text, but also for text incorporated into images. Figure 5.13 illustrates two pictures with the same content; the one on the right side, however, is clutter-free and has noticeably more white space surrounding the text, which ultimately gives the picture a more well-appointed and comfortable feeling while looking at it. (Boulton 2007.)

Chui Chui Tan's study from 2008 shows a good example of a webpage with too little white space. Figure 5.14 is a heat map from the Mark & Spencer e-commerce website.

The text about product information is written too close to the product picture and gives the user a feeling of uneasy reading. (Chui Chui 2009.)



Figure 5.14. Website has too little white space between picture and text on the right side. (Chui Chui 2009)

Now that web designers know the most common scanning patterns, the F-pattern, and that about 80 per cent of content is being basically ignored by the user, it becomes easier to construct a certain type of design structure. Whatever web designers decide to incorporate into a website needs to start with information carrying words, especially on the left panel side of a webpage, in order to be perceived by the web user. (Bergstrom & Schall 2014, 166-167.)

Another critical factor web designers need to know is how to rank business websites in search engines like Google. If there is too little text in the HTML mark-up for search engines to find and rank a website then customers will be unable to find the page. If the text on a website is, for example, embedded into a picture, it means that there is no actual text written as HTML code and therefore is also undetectable for search engines to find. (Arno 2010.)

While desktop users still take the largest slice of the online market, the amount of mobile e-commerce shoppers skyrocketed from 1.4% in 2010 to 13% in 2014, in Europe alone (Statista 2014). Numbers like these suggest how important it is studying this emerging market and taking actions to create specific websites, or adapting existing ones, to serve mobile users appropriately.

# 5.2 How people read web content on mobile devices

Mongoose Metrics' research study (2012) points out that the mobile market is full of potential, yet it has not been explored properly by the companies due to the lack of mobile-ready websites online. The numbers show, however, that the companies opting for having a mobile version to their websites have a strong advantage by doing so.

In 2012, the market share of smartphones worldwide was of 44% and it reached an average of 53.6% throughout 2013, for the first time outnumbering regular phones sales (Lomas 2014). There were about 1.2 billion mobile web users in the world, and they accounted for almost 8.5% of website hits globally, in 2012. (Mongoose Metrics 2012.)

StatCounter (2014) presents even higher numbers than those from Mongoose Metrics: a bit over 14% of web hits made from mobile in December 2012 and 22.16% one year later. This number reached almost 27.5% in July 2014.

The number of mobile broadband subscriptions experienced an average annual growth of 45% on the four years prior to the research. In countries like Egypt and India, more than half of mobile web users are mobile-only, and in the United States one quarter of the users have the mobile as their single source of Internet access. (Mongoose Metrics 2012.)

Laptop computers became the main computer for many, and even smaller devices, e.g. tablets and smartphones, made possible to be online anytime, anywhere. Mobile applications simplified many tasks users perform while connected on their phones, and there is a reason for that: many websites do not offer a mobile version of their pages. In fact, Mongoose Metrics' research showed that only nine per cent of the QuantCast Top Mil-

lion Websites were mobile-ready – 14.8% when considering the top 100 thousand websites. (Mongoose Metrics 2012.)

The lack of a mobile site affects user performance: in a study conducted in 2009 by Jakob Nielsen, the success rate of those users performing tasks on sites designed for mobile devices averaged 64%, while those using the same sites that desktop users see averaged 53%. The same experience was repeated in 2011, with mobile sites scoring the same average and desktop sites accessed on a mobile device raised to 60%. Although the difference is still fairly small, users are still more successful when accessing mobile versions of full websites. (Nielsen & Budiu 2013, 18.)

A research focused on users' perception of mobile webpages was conducted by Djamasbi (2013), from the Worcester Polytechnic Institute, and analysed the impact ads had on individuals from the Generation Y, the group of young adults with ages between 18 and 29 years old, when accessing Google's mobile search engine results page (SERP).

The starting point for Djamasbi's study was the phenomenon known as "banner blindness", where users accessing websites tend to ignore advertisements and give more attention to the search results or other features of the pages. Internet users learned to focus on the actual contents of a page and ignore banners showing advertisements. "Some users exhibit blindness to text advertisements as well as imaged-based advertisements." (Djamasbi et al. 2013, 3.)

For this research, 16 users aged 20 to 24 years old performed two Google web-based searches on iPhone devices. Queries used Google real-time search engine and results were presented as is, without any modifications. The terms used for the research were "free screen recording software" and "best snack in Boston" (Ibid, 4).

Another study involving Google's mobile SERP and eye tracking was conducted by Dmitry Lagun (2014) to measure users' attention and satisfaction when searching on mobile. He divided Google's search results into two categories: Knowledge Graph (KG) results, when Google presents a series of information about a famous person or institu-

tion, and Instant Answers (IA) results that are triggered when there is an implied question in the query, such as "weather today", "stock prices", "sport teams calendars" etc.

For Lagun's research, 30 participants were called and asked to perform a series of tasks, analysing KG's relevance and presence during the first part of the tasks, and IA's relevance during the second session, since IA was always presented by the SERP in that scenario. Examples of the tasks and whether KG and IA were deemed relevant can be seen on figure 5.15. Users were asked to rate their satisfaction level with the search results on a scale of 1 (completely dissatisfied) to 7 (completely satisfied). (Lagun et al. 2014, 3.)

Query	Task Description		
	KG Relevant	KG Not Relevant	
university of cambridge	What was the enrollment of the University of Cam-	Find the rank of University of Cambridge in aca-	
	bridge in 2012?	demic rankings.	
golden gate bridge	What is the length of the Golden Gate Bridge?	Find information regarding tolling and transit	
		through the Golden Gate Bridge.	
the avengers movie	Who was director of the Avengers movie?	Find a link to watch the Avengers movie trailer.	
	IA Relevant	IA Not Relevant	
sfo to atl price	Find the ticket price of the Delta flight from San	Find a website to compare different prices for flights	
	Francisco (SFO) to Atlanta (ATL).	from San Francisco (SFO) to Atlanta (ATL).	
aapl earnings	What is the current stock price of Apple Inc.?	Find Apple Inc. earnings in second quarter of 2013.	
world cup 2014	When does the FIFA 2014 world cup start?	Find a website to buy tickets for the FIFA 2014	
		world cup.	

Figure 5.15. Task descriptions used in the study. (Lagun et al. 2014, 4)

Lagun's study revealed that users gazed more the results below the Knowledge Graph when it was not relevant for the task, as figure 5.16 shows, though users reported being slightly more satisfied with the results when KG was present (average rating 5.69) than when it was absent (average rating 5.28). (Lagun et al. 2014, 4.)

SERPs throughout Djamasbi's research presented one, two or no ads at all, with 40% of the sample receiving results with advertisements. The first action users took after presented with the search results was either clicking the first result (37% of the sample) or scrolling the page to read more entries (63%). (Djamasbi et al. 2013, 4.)

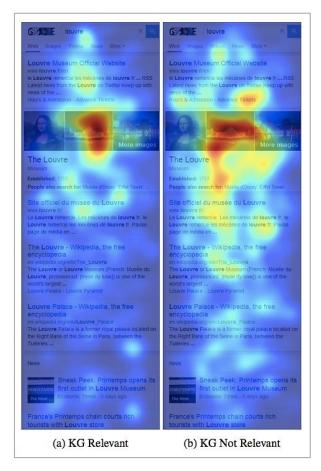


Figure 5.16. Gazing points in SERP and KG's relevance. (Lagun et al. 2014, 6)

The presence of advertisement on the SERPs had no significant impact on the time users took to make the first action (click or scroll); however, when the SERP presented ads for the users, it took them much longer to click on the first search result (mean= 7.43 seconds) when comparing with the ad-free page (mean=4.6 seconds); on the other hand, users were quite faster to scroll the page when confronted with advertisements (mean 2.89 seconds vs. 5.12 seconds when without ads), as figure 5.17 shows. (Ibid, 5.)

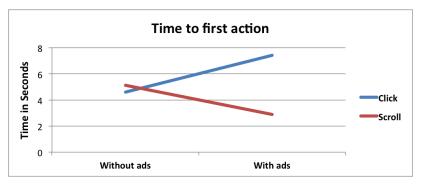


Figure 5.17. Time to first action based on action and presence/absence of ads. (Djamasbi et al. 2013, 5)

Although users that scrolled the SERPs before clicking did it faster, on an attempt to bypass the advertisements, heat maps seen on figure 5.18 revealed that users paid attention to those ads, nonetheless. "Eighty two per cent of the users who were presented ads viewed at least one ad." (Ibid, 5) Headings received a considerable amount of gazing, as well.



Figure 5.18. Heat maps on SERPs presenting none, one and two ads. (Djamasbi et al. 2013, 5)

The research analysed the average duration of users' gazing for the first screens, both with and without ads. For the screens with ads, the mean time was of 3.21 seconds, versus a mean of 3.08 seconds for an ad-free screen. The first result entry presented by the SERPs was the one where users paid the most attention, whether or not the page presented advertisements. 86% of the sample paid attention to the second entry, and only 14% noticed also the third result item (Djamasbi et al. 2013, 5).

Lagun's research, however, had different results when compared to those of Djamasbi: surprisingly, results ranked second and third (out of ten shown in the first SERP) got higher gazing times and also spent more time on the mobile's viewport, the area of the page visible on screen, as seen on figures 5.19 and 5.20. This might be because, unlike desktop computers, where users can scroll down one page fold at a time using page up/down keys, users on mobile devices can do shorter scrolls at a time, omitting just one result from the viewport and, then, leaving second and third results longer on the screen. (Lagun et al. 2014, 7.)

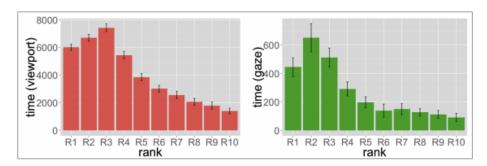


Figure 5.19. Time (in milliseconds) search results stayed on the visible area of the screen and how much gazing those received. Viewport stands for the visible area of the page and rank corresponds to the position of the result in the SERP. (Lagun et al. 2014, 7)

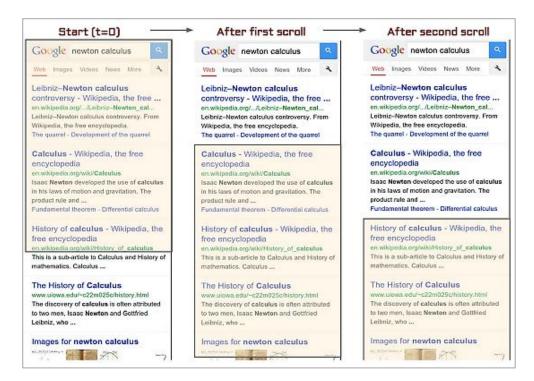


Figure 5.20. Results seen during different scrolls. The yellow box represents the visible portion of the screen from the start and after first and second scrolls. (Lagun et al. 2014, 8)

The heat map shown in figure 5.21 demonstrates that the top half of the screen receives more attention, with the gazing hotspots leaning slightly to the left. The pattern is similar to those seen on eye-tracking studies on desktop computers and is fairly consistent with the heat maps presented by Djamasbi.

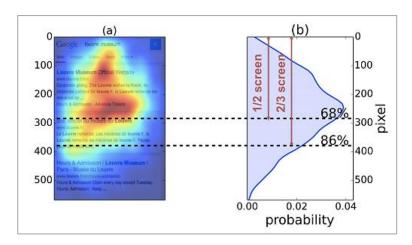


Figure 5.21. Heat map of where users spent more time looking on the phone (left) and distribution of fixations along the vertical axis (right). (Lagun et al. 2014, 8)

Besides positioning page's elements in a way that users can view and access content more easily, the nature of the mobile environment, where devices' screen sizes rarely exceed five inches, makes users' comprehension of webpages considerably lower than those accessing the same page on a desktop/laptop computer. This is especially the case when reading complex information, such as end-user agreements and contracts, which use technical and specific language not familiar to the general public.

#### 5.2.1 Content complexity in mobile devices

R.I. Singh from the University of Alberta analysed the privacy policies of ten popular websites, among them eBay, Facebook and Google, by conducting a Cloze test on those pages (Nielsen & Budiu 2013, 102). The Cloze test consists of replacing any "Nth" word in the text with blanks (usually N = 6, but different values can be used). Test participants read the modified text and try to fill in the blanks according to their comprehension of the text; each participant does it alone. The test score is the percentage of correctly guessed words (Ibid, 103).

In order for a page to be considered easy to understand, Cloze test score must be 60% or higher. Singh's study had 50 participants completing the test in either desktop computers or mobile devices. The test had an average of 39.18 per cent comprehension score for desktop users and 18.93 per cent for those using iPhone-sized screens (Ibid, 102).

Cloze test scores for mobile users in this test were 48% of those achieved by desktop users, thus being twice as hard to understand complex content when reading on a smaller screen. And because this test's only task was to read a single page of information while being in a lab, without the interference of noises or other environmental events, the conclusion was that the smaller screen size was the only reason for a poorer performance, since this was the only difference between desktop and mobile groups in this test. (Ibid, 104.)

According to Nielsen and Budiu, smaller screens reduce comprehension because of two factors. First, "users can see less at any given time" (Nielsen & Budiu 2013, 105), so they have to rely on memorizing what is not in the viewable space anymore to understand the context of what is on screen at that given time.

The second point impacting comprehension is the amount of scrolling required to refer to other parts of the content, instead of simply looking back at the text. Scrolling itself brings three other problems:

- Memory is compromised because of longer scrolling times.
- It diverts attention from the main problem to the secondary issue of searching another part of the text.
- Finding the previous location on the page is another issue created by scrolling (Ibid, 105).

Although users like to use their mobiles to "kill time" while waiting around for e.g. a train or a medical appointment, they want to do that effectively: "mobile users are in a hurry and get visibly angry at verbose sites that waste their time." (Nielsen & Budiu 2013, 108), because it's twice as hard to understand content on small screens as it is on bigger desktop screens; therefore, lengthy content is often not seen with good eyes.

Many test users from Nielsen's research commented about not willing to read whole news stories, especially those containing "filler" content, on their phones. "Filler" is any piece of information that do not provide something relevant to what's being said on the

page, and this is especially true when considering news websites. A mobile test user reading the breaking news about a tornado complained about having to read quotes from local people, which in her opinion it was too much reading, without clear purpose for the story. (Ibid, 109.)

The best solution for websites on mobile is to be concise, straight to the point. Instead of starting the webpage with a "welcome" text, focus should be given to answering two important questions: "what?" – i.e. what will users find on the page; what's it all about? – and "why?" – why should they engage in visiting that page, what are the benefits? After all, users read in average only 120 words per page view, a very small amount to be wasted with verbiage. (Nielsen & Budiu 2013, 111, 113.)

# 5.2.2 Designing for mobile devices

When designing mobile-optimized webpages, the main point developers should have in mind is productivity: "when users are successful and satisfied, they're likely to come back" (Nielsen & Budiu 2013, 18). To achieve this, some points should be regarded when using the adaptive design – i.e. when a website presents content and features varying from screen size and devices:

- In adaptive design, the website should have a mobile-optimized version built separately, for enhanced experience
- Redirect mobile users automatically to the mobile version of the website when they
  arrive at the desktop version. A link to the mobile version should be placed on the
  full site, in case redirection does not work
- The mobile website should include a link for the full website, so that users could access it to perform actions restricted to the full version. Figure 5.22 shows Wikipedia's mobile website, which offers a link to its desktop version on the bottom of the page. This is not the case when using responsive design approach, when page is dynamically adjusting according to the screen size
- Features that are not vital to the website should be cut in the mobile version

- Restrict content to reduce word count and send users to secondary pages, where the full text can be found
- Interface elements, e.g. buttons and hyperlinks, should be larger to prevent the "fat finger" problem, when users click accidentally elsewhere when trying to click a specific link or button. (Nielsen & Budiu 2013, 18-20.)

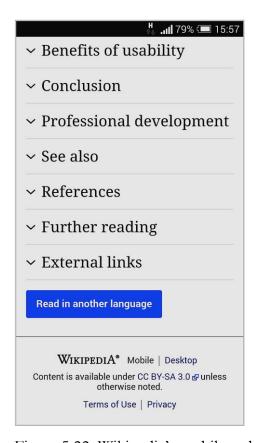


Figure 5.22. Wikipedia's mobile website offering a link for the desktop version.

In the case users come to some specific page on the website from a link in an e-mail or social media site, make sure they will be redirected to the appropriate page, even on mobile. This prevents them from landing on the home page of the mobile website and having to search for the page they wanted to read in the first place. (Krug 2014, 150.)

Another point to keep in mind when designing websites directed to mobile is to have visual clues in objects to tell the user right away what those objects are for; those clues are called affordances. Krug (2014, 151) notes that buttons designed using three-dimensional style tell users right away that they are meant to be clicked. The same is valid for hyperlinks, which should be distinguishable from the ordinary text, and text boxes

being rectangular boxes with a border around, suggesting users that they could click and type some text on it.

Affordances that are easily distinguishable work especially well in the mobile environment, where the effect of changing colours or appearances when hovering the mouse over interactive elements is not present, due to the lack of the cursor itself. Trendy "flat design", which removes visual distinctions from objects like buttons or text fields, makes interactive elements harder to be recognized and can be a problem on mobile devices for the same reason. (Krug 2014, 152-153.)

In order to serve more people with websites well adjusted for mobile and tablet devices, an approach known as "responsive design" can be used to develop websites. Responsive design presents some advantages for companies that want to make their website available to other screen sizes while keeping content availability uniform across platforms (Nielsen & Budiu 2013, 18). Figure 5.23 shows an example of how the same page is presented on a desktop computer, tablet and mobile phone.



Figure 5.23. Example of website using responsive design on a desktop computer, tablet and mobile phone. (Richard 2013)

One of the upsides of responsive design is maintenance cost, since only one website can be created and the only work is to make sure it will work fine for smaller screens, avoiding the cost of maintaining multiple mobile apps. Another point is that responsive design will give better support for users who have mobiles as their main source of access to the web. (Nielsen & Budiu 2013, 18.)



Figure 5.24. The Boston Globe website's desktop (A) and mobile (B and C) versions. (Nielsen & Budiu 2013, 29)

News websites can benefit from responsive design, since most of their pages' content are likely to be accessed from both desktop and portable devices (Nielsen & Budiu 2013, 28). As an example, The Boston Globe uses responsive design to deliver the same information from its full website to its mobile version. The horizontal menu bar below the

logo becomes a dropdown menu; a larger picture presents current's top story, while minor articles come right after that, as seen on figure 5.24.

Some features presented in desktop-sized websites do not work just as well when viewed on mobile devices, due to the limitation of the screen size. Websites with deep hierarchy, with many categories and subcategories, pages presenting long lists or texts can be difficult to be used on smaller screens, demanding too much scrolling. In this case, a solution can be compressing content to present only the most important information, giving the user the option to expand the full content on demand. (Nielsen & Budiu 2013, 28.)

Just like news websites, online shops also have all of their features accessed from other devices than a desktop computer; thus, the responsive design approach might account for fewer features removed from the mobile version, bringing users a better experience when shopping in the website.

#### 5.2.3 Business-to-consumer website for mobile devices

When designing a business-to-consumer (b2c) website such as an online shop, the full range of products should still be available on the mobile website; if users cannot find a product, they will search somewhere else. Thus, only functionalities that are not important should be taken away, because of the restricted environment (Nielsen & Budiu 2013, 20).

One approach for creating b2c websites under responsive design is to divide the page into five sections: the masthead, image gallery, product description, auxiliary information and footer (Richard 2013).

The masthead is the top part of the page and is a combination of header, the company's logo and a menu for primary navigation. The header should be small and simple – easy to see but with only the most important information. The logo should be larger than the header and scaled down for mobile devices, and the menu can be done using different approaches – e.g. a simple menu in the header toggling main navigation items, or a navi-

gation tray that will slide from the left corner of the screen to reveal its contents when clicking a menu icon. (Richard 2013.)

A search box is also a good idea for the customers to find directly what they are looking for. Figure 5.25 shows Curry's website, an online shop from the United Kingdom that implemented responsive design. Notice that when accessed on mobile, Curry's logo and the search engine right below it are quite prominent. (Creative Bloq 2013.)

The image gallery for small screens should be done by implementing a touch-friendly image carousel, so that users are able to swipe through products easily, even when using smaller phones. Smaller images should link to their larger counterparts, to accommodate different product views in the page (Richard 2013).



Figure 5.25. Curry's online shop using responsive design. (Creative Bloq 2013)

For the product description area, a brief description of product name, price and popularity (or rating) should come before the image, to help the customer to decide about the product before the page is fully loaded. Rating stars and review count should be placed below the product details. A button to enable the user to share the product over social media is a good idea to increase exposure; only one button should give the option to select which media to share, though. (Richard 2013.)

The auxiliary information helps customers by showing ratings and reviews of the selected product and also suggesting similar items they might be interested in viewing. For mobile devices this information should follow the principles of responsive design, by showing smaller images and shorter text, leaving up to the user whether to view the items in more detail or not. The footer might include navigation links for easy access of different areas of the website, as well as customer service phone numbers and e-mail. (Richard 2013.)

Another side of designing that needs to be taken care of is to address psychological aspects in a way that it is comfortable for users to be on the website long enough to make them feel engaged in using it and completing tasks successfully – this is especially the case when the task in question is completing a purchase in an online shop.

# 5.3 Psychological aspect of web design

Every web designer should know a little bit about human psychology, as it plays a huge part in how we look at webpages. A few key points of why we show similarities while reading web content are for example the Baby-Duck-Syndrome: humans do not like drastic changes and that we are most comfortable with what we already know. New things have a learning curve and initially make us feel uncomfortable. (Chapman et al. 2012, 76; Ismail 2012, 32.)

Banner-blindness is another key point of human psychology; we do not like unnecessary content that makes it hard to find what we are looking for, so we very effectively block it out. When it comes to the World Wide Web, we can determine that humans are lazy-readers, as we tend to scan through webpages rather than reading the content. (Bergstrom & Schall 2014, 28-39; Chapman et al. 2012, 76; Ismail 2012, 32.)

Susan Weinschenk, PhD in Psychology, wrote an extensive book in 2009 about what makes people click. When people browse through website, they are led to believe that they are making their own choices, while being reasonable and rational. The truth is that our online behaviour can be redirected, and most of the decisions and actions that we make on the web are highly influenced. (Weinschenk 2009, 1.)

If something is unavailable we want it even more, and e-commerce business owners know that. Statements like "Buy Now! Only 1 product left" invoke scarcity and make people to hurry up with a purchase because the product could be sold out soon, and the longer people think if they really need or want the product, the slimmer the chances of an actual purchase. (Weinschenk 2009, 45.)

On the other hand, too many choices are a purchase killer. If people are given too many choices they might freeze up, since making a choice might become too hard, leading to an overwhelmed state of the shopper. Chances are the shopper will not choose anything at all, resulting in a lost sale. (Weinschenk 2009, 51-52.)

Web designers sometimes seem to forget that considering psychology while designing can make a big difference on the end result; it will most likely keep users happy and make them want to pay more attention to what they see on the website. Incorporating psychological and emotional triggers into a website can influence online users to make the right choices. Images, for example, can trigger these senses by directing the eyes of the user to the desired place. Figure 5.26 shows on the right a baby looking at the text the website wants to emphasize, while on the left side the baby is looking away from the text. (Chapman et al. 2012, 18, 55-56.)

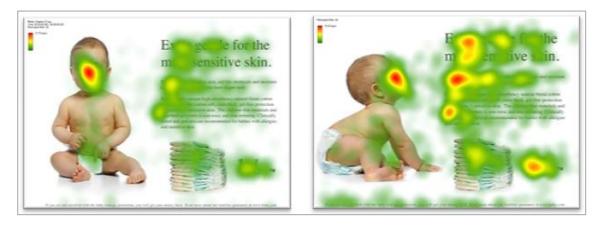


Figure 5.26. The picture on the right shows the baby looking straight at the advertised text, triggering the user to follow the baby's eyes towards the text. (Chapman et al. 2012, 55-56.)

### 5.4 Cultural differences in web design

Culture plays a big role when designing websites, especially when trying to communicate to an international audience. When designing for the World Wide Web, it is important to remember that web accessibility is worldwide and 66 per cent of the world's population is non-Christian (PewResearch 2014). International user acceptance is a whole new challenge that designers need to take on, of which religion is a big part.

The research carried out by a University Web Research Group consisting of four PhD graduates in 2013, shows the importance of cultural background when designing and reading webpages, more specifically between groups from the Middle Eastern region vs. Western Europe. The study focused mainly on Spaniards, scanning through the first page of Google's search engine in their native language, while Arabic test subjects used English as default language. The goal was to gain an understanding of how cultural backgrounds affect interaction on search engine webpages. (Marcos et al. 2013, 1.)

A total of 117 people, 60 from Barcelona and 57 from Dubai, participated in the research, of which 63 % were women. 80% of the participants were between 18 and 40 years old. The users were asked to answer questions while looking at three different versions of the search engine. Their visual search patterns on the screen were tracked with eye-tracking technology. (Marcos et al. 2013, 4.)

Figure 5.27 shows on the left test results from the Arabic participants, while the Spanish test subjects' visual behaviour can be seen on the right. While the Arabic test participants stayed much longer on the search engine reading through the content, Spaniards showed a clear lack of attention span, scanning only through the top part of the page. Although more work would be needed to get a clear result on cultural differences, this research shows an interesting side on how culture can affect visual behaviour.



Figure 5.27. Test results while testing Google search engine (Left: Arabic, Right: Spanish). (Marcos et al. 2013, 4)

For those users whose native languages have right-to-left reading, such as Arabic and Hebrew, the focus point changes accordingly: the top-right side of the screen receives much more attention than the left side, because that is where lines of text begin in those languages (Nielsen 2010).

However, the layout of websites on right-to-left reading countries is not necessarily a mirror to those commonly found on left-to-right reading languages. Figure 5.28 shows that Dubai newspaper Emarat Al Youm is in fact fully aligned to the right, but Israeli newspaper Haaretz still uses a navigation bar to the left – even though text is also right-justified. Since no eye-tracking studies were conducted in Israel, it is unclear if the reverse pattern seen on English-language sites can be applied in this case. (Nielsen 2010.)



Figure 5.28. From left to right: newspapers Emarat Al Yaoum from Dubai and Haaretz from Israel. (Nielsen 2010)

# 5.4.1 Images

Visual representations might carry different meanings, depending on which audience is viewing the website: for instance, an owl represents wisdom and grace in various cultures, but in many Arabic countries it is a symbol of pessimism. In China, a green hat symbolizes infidelity, thus should not be used on a website targeted to the Chinese market. (Arno 2010.)

Another clear difference across cultures is the portrayal of people in images and/or videos: Hardee's, an American fast-food chain, presents beautiful young women appreciating offerings in their videos, which is attractive to the Western audience but not seen with good eyes in the Middle East. (One Lily 2013.)

Still in the food market, images of large beef hamburgers is appealing to customers from many cultures, though in India such images would be offensive, since the cow is sacred in that country. Likewise, some nations allow dog and horse meat to be consumed and those dishes will attract local customers; on the other hand, most of the Western audience would be repelled by food prepared with meat from those animals. (Ibid.)

Cultural symbols should be used with caution, in order to fulfil the local's expectancies. For example, an American flag placed upside-down "can mean distress or defiance depending on the context, and is generally viewed as distasteful." (One Lily 2013) In fact, disrespectful behaviour towards national flags is in many cultures seen as a severe insult (Ibid).

#### 5.4.2 Colours

Colours are directly related to feelings and do not mean the same to different cultures. The colour red, for example, means luck for the Chinese population; in Japan it means anger or danger and in Egypt it means death. In Western cultures it signifies love, passion and excitement, though it is also used for danger (Cousins 2012). Figure 5.29 displays colours and their cultural feelings and figure 5.30 displays colours and their religious meanings. (Stathoyiannis 2013.)

When designing a website, red can be used as an accent colour, though too much of its brightest form can be overwhelming, and its darker tones convey elegance. Orange calls attention in a more friendly way, without being as overpowering as red, and is also used to represent citrus fruits, especially in Western cultures. Yellow is the brightest of the warm colours, brighter yellows representing sunshine and cheerfulness, with lighter tones being calmer versions of the bright ones. Its golden variations are commonly associated with money and success across cultures. (Chapman 2010; Cousins 2012.)

Blue is the cold colour most used for bank logos, as its darker shades symbolize trust, reliability and authority in the Western world. It is regarded as soothing and peaceful, though also linked to depression or sadness. In China, the colour is considered feminine and, in the Middle East, blue means safety and protection. Green has close relation to nature worldwide, and in Western cultures it also means luck. Green presents the calming features of blue combined with the energy of yellow. Brighter greens are vibrant, and darker hues are the most stable ones. (Chapman 2010; Cousins 2012.)



Figure 5.29. Colour perception by culture. (Stathoviannis 2013)

Brown is regarded in most cultures as earthy and neutral, making it usual to be adopted for backgrounds, and its darker forms can replace black also in typography. In Western cultures it is stable, dependable and wholesome, though in many Eastern countries it is the colour of mourning. Black is a versatile neutral colour: it is used in edgier and also very elegant designs, and depending on the combination with other colours it can be modern or conservative, traditional or unconventional. It symbolizes magic and the unknown to different cultures around the globe. (Chapman 2010; Cousins 2012.)

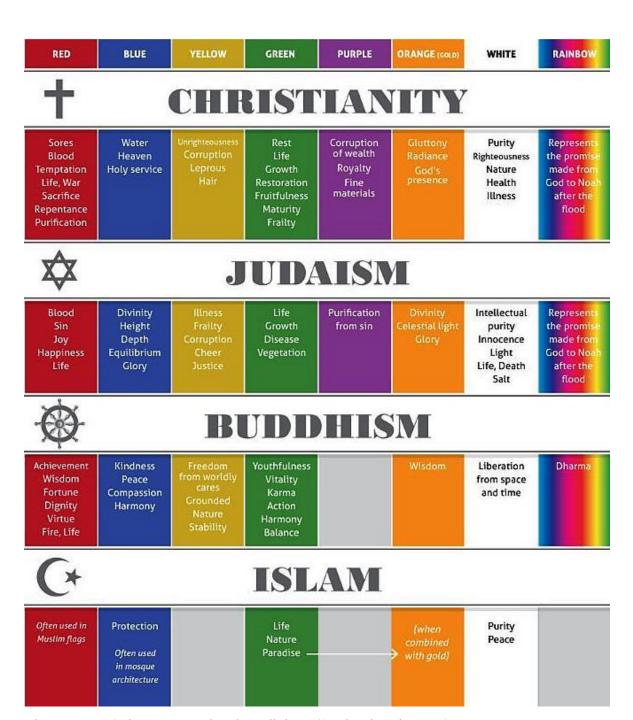


Figure 5.30. Colour perception by religion. (Stathoyiannis 2013)

Purity and peace characterize the colour white in Western countries, and in many Eastern cultures it signifies sterility, mourning, unhappiness and misfortune. In the Middle East, both purity and mourning are related to the colour, and the white flag is recognized as truce worldwide. Like black, white can work well with basically any other colour, being used as a neutral backdrop to call the attention to other colours in the design. It can help to give the idea of simplicity and it is widely used in minimalist designs. (Chapman 2010; Cousins 2012.)

With so many symbolisms that images and colours carry across cultures, it is very important to define which approach to take when designing a business website that will be potentially accessed by different audiences; more than developing a functional website that follows usability principles, analysing habits of the people from where the company wants to reach out is essential for choosing the right colour palette and set of pictures to communicate properly and make a good impression.

# 6 Webpage design and analysis

This chapter contains an analysis of existing online websites for desktop and mobile devices, such as Amazon, eBay and Google's search engine, as well as an analysis in cultural differences. The website images shown are from above the page fold, meaning the part of a website users see without scrolling down; images of the full pages can be found in attachments. Part of this chapter will describe testing and evaluating an own website, designed with the results found in chapter 5 – How people read webpages.

# 6.1 Google search engine

Google's search engine seen from desktop computer displays a uniform layout and draws the users' eyes straight to the very large search field. The search links on the website have large headlines, and the descriptions below are clearly separated with a smaller font size for easier reading. The large-scale hypertext search engine has plenty of white space between the texts and overall very few colours. The ads on the right side look like they belong to the page and are, therefore, not completely ignored by the user.

Figure 6.1 shows Google's search engine without search keywords: it is clear of advertisements and easy for the user to search, while figure 6.2 demonstrates how the search engine looks with search links. The full-length version of Google's search engine results page on desktop computer can be seen in appendix 1.

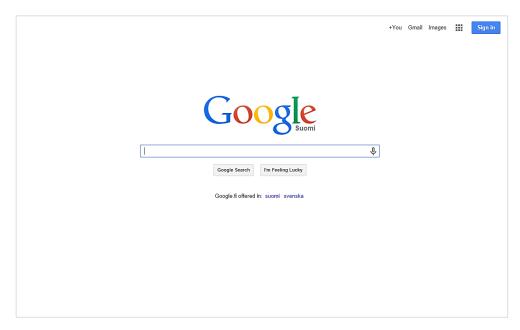


Figure 6.1. Google search engine's desktop webpage before using the search function. (Google 2014)

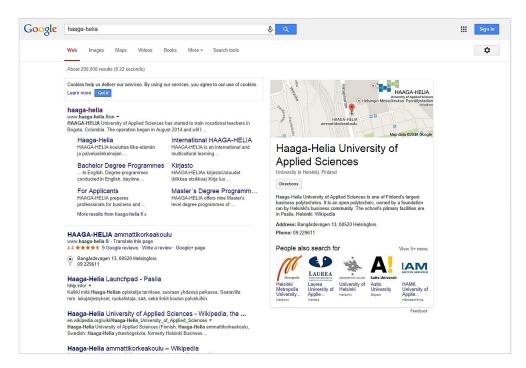


Figure 6.2. Google search engine's desktop webpage after using the search function. (Google 2014)

Google is consistent with its clutter-free look on mobile as well; few options are available in its front page besides the search field, as seen on figure 6.3. The header offers just the web and images search, a button to sign in to Google accounts and a side menu icon, where other Google products can be accessed. The footer shows information

about the location (when available), as well as settings, the option to change to the local Google website and links for business, advertising and company information.

When opening the page from a device using Android, a message offering its mobile app is presented at the top of the screen, before the header. Google will also ask permission to access the user's location, in order to provide services specifics to the region.

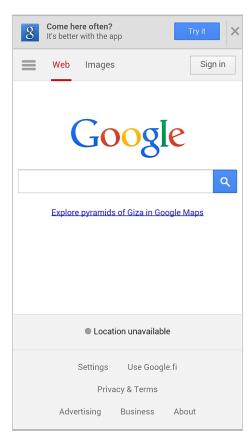


Figure 6.3. Google search engine's mobile front page. (Google 2014)

The search results page shows first the most relevant website and information about the searched term – in this case, Haaga-Helia –, a map to the location and options to get directions, visit the website or call the University. There is virtually no space wasted in the page; fonts are of adequate size for reading and displaying descriptive content of the results, using neutral colours just like in its desktop version.

After the page fold, another link to Haaga-Helia's front page is presented with a 5-star-based ratings and reviews, and the first six results are presented, as well as related searches and a button to show the next results – the SERP presents ten results from

page 2 onwards. The results presented by Google are also based on the user's location, which is why results in Finnish can be seen on the first page, even though the device has English as its default language. Figure 6.4 shows the first two folds of the search results page, and the full-length version can be seen in appendix 2.

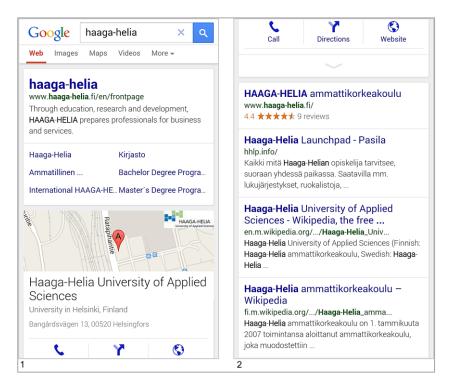


Figure 6.4. First two folds of Google search results page on mobile. (Google 2014)

Google's front page for tablets is very similar of that for mobile; it also offers the app in the pre-header and the page is very clean, with Google's logo and search field in the middle of the screen, and a very minimalist footer. In the search results page it also shows the most relevant information about the searched term, then the first ten results followed by related searches and the navigation buttons.

However, users might be bothered with the large grey area on the right side of the results page; having the page content centralised based on the screen's width would mitigate the problem. Figure 6.5 shows the front page and figure 6.6 the first screen of search results as seen from a tablet. The full length of the search results page can be seen on appendix 3.

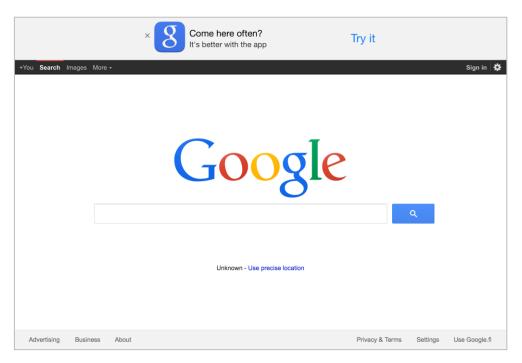


Figure 6.5. Google's front page on a tablet. (Google 2014)

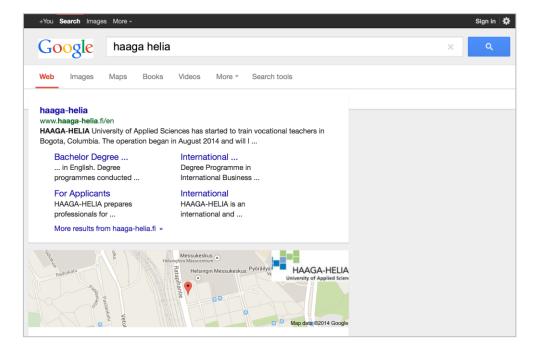


Figure 6.6. Google's search results page on a tablet. (Google 2014)

#### 6.2 Amazon

Figure 6.7 shows Amazon's desktop computer homepage above the page fold, while figure 6.8 is a picture of the website after using the search function. The site is mostly uncluttered and immediately redirects the user's eyes to the most important parts of the

website: the search field, the call-to-action bar and the navigation panel. The advertisement on top of the page fold, though, has too little white space around, giving the online shopper a cluttered feeling when trying to use the call-to-action buttons. The site has only a few warm colours that have been cleverly placed on the parts where the user should look first, the user is able to instantly find what he/she is looking for and place a purchase.

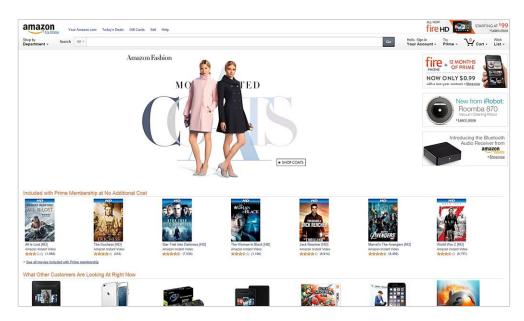


Figure 6.7. Amazon's desktop homepage without search word. (Amazon 2014)

There is also a great deal of white space between products, and the different page sections are clearly visible. Even the smallest product pictures are of good quality, and the online shopper is not faced with a wall of text. The main layout of the site gives an orderly feeling and inspires the user to make a fast and easy purchase. The full-length of Amazon's desktop website can be seen in appendices 4 and 5

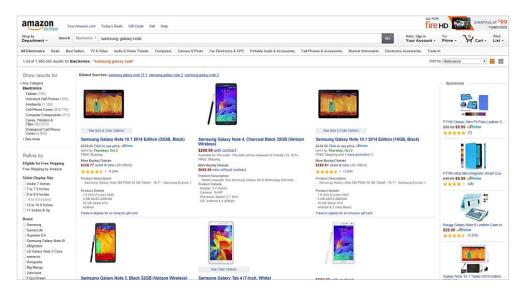


Figure 6.8. Amazon's desktop website after entering keywords and using the search function. (Amazon 2014)

When accessing Amazon's mobile website, one of the first things noticed is a pre-header notice, which can be closed, inviting the user to get to know its app. The banner uses dark colours, contrasting with its page's lighter colours, to call the user's attention. The first two folds of the page can be seen in figure 6.9, with its full-length presented in appendix 6.

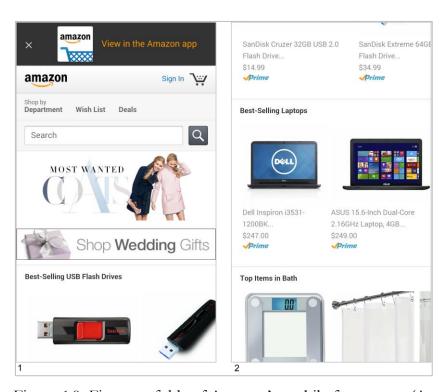


Figure 6.9. First two folds of Amazon's mobile front page. (Amazon 2014)

Amazon's mobile version has neutral colours like its desktop counterpart, albeit using even less colours – the same hue of grey is used for both the product headline and price. The site has a minimalist header, with its logo on the left side, a hyperlink to sign in and the shopping cart on the right side. Right below it, on the left side the user finds links to access all departments of the store, as well as wish list and deals. In the next line, the user can find the search box, which uses search suggestions for faster searching experience.

The content area of the page displays an automatic slider, advertising products and departments of the web shop; users can swipe left or right to select the product or area they wish to go, in which case slider stops its automatic turning. Three different sets of carousels present best-selling products in different departments, also enabling users to swipe through the advertised products.

The bottom-half part of the front page shows a grid with four other items; this time, however, just the name of the product and a very brief description is presented, calling the user to click on the items to know more about the items, including its price. Following that, the user can see a list of some of the store's departments (all departments can be accessed at the bottom of such list). Past the list of departments, another list presents account-related options, as well as customer service and a link to Amazon's full site.

Amazon's search results page shows right past the search field a bar containing on its left side how many results it brought and on the right-hand side a small icon allowing users to change the disposition of the results in the page, as well as a link to filter the results. The amount of results returned per page depends on the disposition settings users select. In the default setting, where the user sees a picture of the product, a description, price and rating, the first 14 results are presented, but it can go up to 30 results if other settings are selected.

Following the organic results, two sponsored results are shown, also presenting pictures, price and ratings. Related searches and buttons to navigate through the results come

after the results list. Figure 6.10 presents the first two page folds of this page, and its full length can be seen on appendix 7.

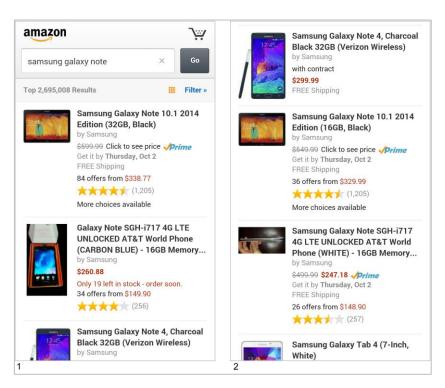


Figure 6.10. Amazon's search results webpage on mobile. (Amazon 2014)

Amazon's tablet version makes use of the higher screen resolutions those devices have to present a page that is closer to its desktop counterpart. In fact, the page uses every inch of available space to advertise its products and services, which makes the page a bit cluttered; however, the header gives quick access to searching, departments and the shopping cart, making it easy for users to go straight to what they are looking for.

The search results page is more objective, with a sidebar on the left giving options to filter results by categories and other features, related searches and the first 15 results. Figure 6.11 shows Amazon's front page as viewed on a tablet, while figure 6.12 shows the page after search results. Appendices 8 and 9 show those pages in full length.

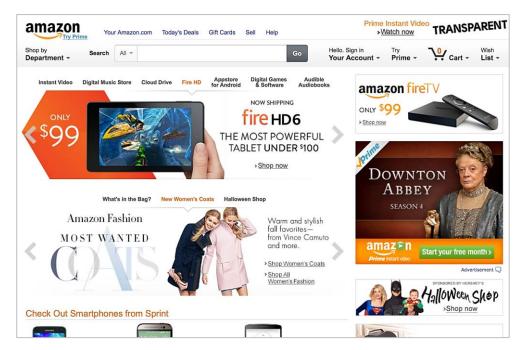


Figure 6.11. Amazon's front page on tablet. (Amazon 2014)

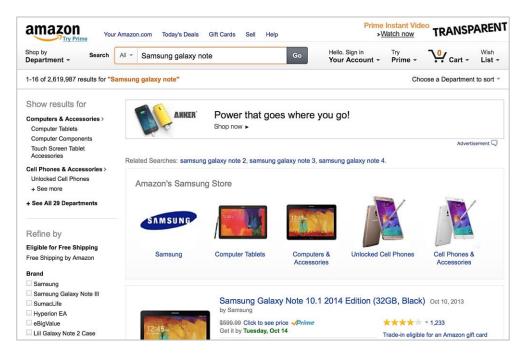


Figure 6.12. Amazon's search results page on tablet. (Amazon 2014)

# 6.3 eBay

eBay's online shop is very similar to Amazon when it comes to search field and navigation panel, and the shopping cart is also at the upper right corner as expected. The signin button, however, is at the upper left corner, instead of the upper right corner and is unclearly marked. This confuses the user and makes the button hard to find. Even

though the overall layout of the page seems cluttered and very long, it is surprisingly easy to scan through the page. The reason for that is that the different sections of the page are clearly visible; nothing is clunky or looks like advertisements, making it easy for the user to search for products. The website has large headlines and there is enough white space between text and pictures.

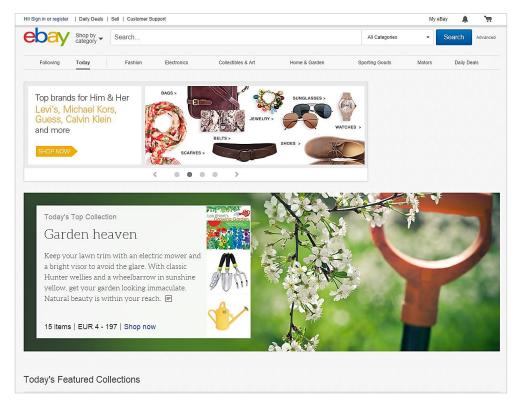


Figure 6.13. eBay's desktop homepage without using the search function. (eBay 2014)

Figure 6.13 shows how eBay's desktop computer homepage looks without entering search keywords while figure 6.14 shows how the page looks after searching. The product pictures are large and of good quality, but since eBay is open for anyone to sell their products, that depends entirely on the sellers' preferences. The full-length version of eBay's desktop computer website on can be found in appendices 10 and 11.

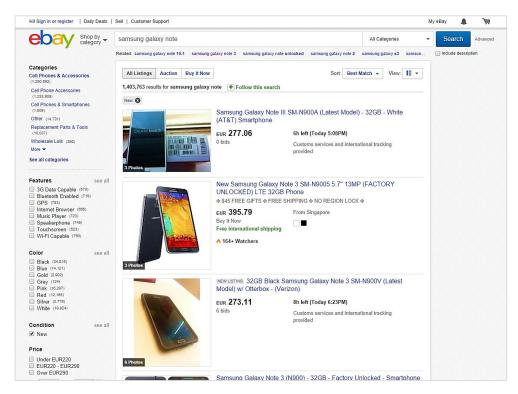


Figure 6.14. eBay's desktop website after entering a search keyword and pressing the search button. (eBay 2014)

The mobile version of eBay's front page is very tidy and minimalist. The header shows eBay's logo on the left side, search, sign in and shopping cart as icons on the right side and a search bar across the screen's width right below the header. The site uses neutral colours white and grey and no products are announced at the front page; instead, three main categories are presented, each with three images linking to subcategories. Below this section, a bar announcing all categories can be clicked. Towards the end of the page, the user can find links to the home page, my eBay, sign in/register and customer support. On the footer, a link to the classic site is available. The full page with both folds can be seen on figure 6.15.

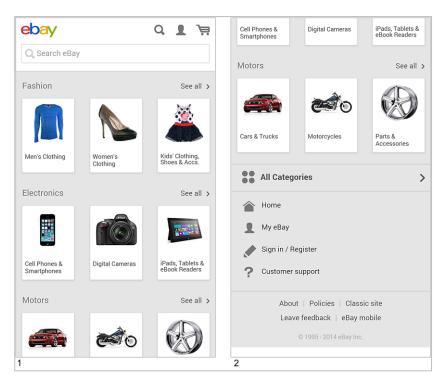


Figure 6.15. eBay's mobile front page. (eBay 2014)

Just like Amazon's website, the search field presents suggestions to what users might be trying to find, making searches likely faster. The search results page presents the first 24 results in order of relevance, related searches, navigation bar and sponsored links, in that order. The total number of results can be viewed at any time as a "sticky footer" – i.e. no matter in which part of the page the user is, it will still be shown at the very bottom of the screen.

At the upper part of the screen, users can sort the results and change the way items are displayed on the right-hand side of the search field, and below it a carousel of links allow users to refine results by a number of options, such as brand, colour and price. This upper part of the screen is also sticky like the results footer, so that users can change search parameters without the need of scrolling back to the top of the page, as seen on figure 6.16. The full length of this page is on appendix 12.

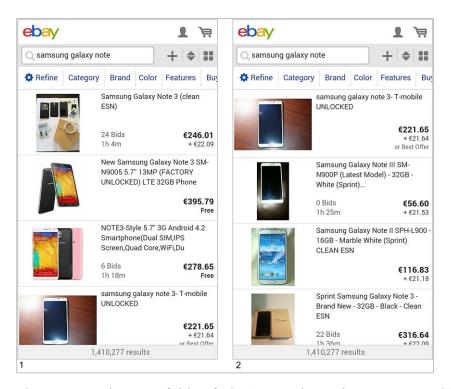


Figure 6.16. First two folds of eBay's search results page on mobile. Header and footer are always visible to display relevant information and allow easy access to search features. (eBay 2014)

The tablet version of eBay's website also takes advantage of the larger screen of tablets to present more information on its first page; in fact, the page presented in the tablet used in this research was the same as the one seen on the desktop version – the same happening with eBay's search results page for tablets. The desktop and tablet website screens presented in this research differ only for the fact that they have been taken in different dates. Figures 6.17 and 6.18 present eBay's front page and search results page, in that order. Appendices 13 and 14 show the both pages in full length.

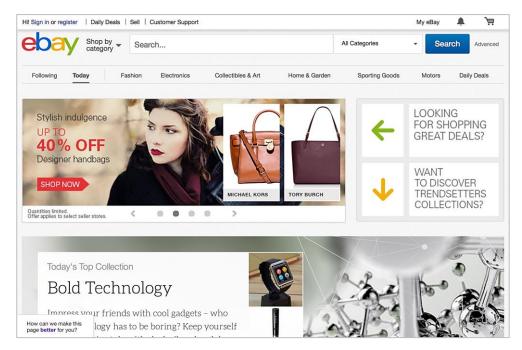


Figure 6.17. eBay's front page as seen on a tablet. (eBay 2014)

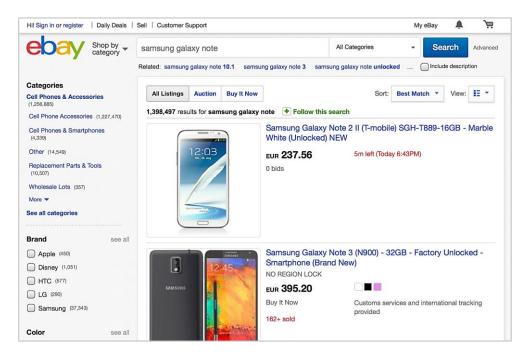


Figure 6.18. eBay's search results page on a tablet. (eBay 2014)

### 6.4 Designed e-commerce test website

The sample website represents a small online shop, which has just started business and, like so, does not offer a large selection of products for sale. It was created according to the concepts presented in chapter 5 – How people read webpages, with the objective of

validating the theory through usability tests and testing questionnaires performed by test subjects, as well as heuristic evaluation and a click-tracking tool to help the analysis.

The graphic design software used to create the main layout for this test website was Adobe Photoshop and the version used was CS6. Photoshop is a raster graphics editor firstly created by Thomas and John Knoll in 1988 and is widely used to edit and create graphic files. (Wikipedia 2014.)

In web design, Photoshop is very useful in designing customized icons and buttons, as well as creating content for the main layout of a website. The graphics created by the software are sliced and saved as, for example, JPEG or PNG graphic files. (Wikipedia 2014.) The files are then incorporated into content management systems, like in this case Wordpress, using HTML and CSS.

Wordpress is an Open Source project, started in 2003 as a personal blogging system to aid users to manage blogs in a faster, more organized way. With millions of users worldwide, it has evolved to become a content management system (CMS), which in short stands for an application where the author or content manager can create, modify and delete pages without the need of knowing HTML coding (Wordpress 2014; Svarre 2011). Wordpress, therefore, is used for different purposes nowadays, including b2c websites.

Wordpress was used to setup the website, as it is one of the fastest and simplest ways to get a small-sized b2c website started; a wide variety of themes, which will provide the look and feel of a page with pre-set pages and styles, can be selected for free, and many other themes are available for purchasing.

Wordpress also gives the option to install plugins, which are side applications that can be appended to the website to extend its functionalities. For online shops, plugins will build the basic structure necessary for a b2c website to be up and running, such as products management, search functions, shopping cart and order processing, both in front-

end (the pages) and back-end (management) sides. Those plugins also come with free versions, and paid ones giving the administrators more functionalities and control.

Even though it is possible to create websites without the need of coding, Wordpress also lets developers add or modify the source code of pages and plugins, to customize functionalities and the general look-and-feel to their needs. For the sample website, the chosen theme and plugins were modified to give the website the looks it has now. The theme chosen for the sample website uses responsive design, meaning that the same page is adjusted according to the screen resolution of the device used, from desktop computers to smartphones.

# 6.4.1 Test website for desktop computers, smartphones and tablets

The sample of the e-commerce test website can be accessed at the preliminary link http://sandbox.bacso.net. It is important to notice that, although the website has a functional online shopping structure, for now it is a temporary version and will be fully implemented at a later stage. The finished e-commerce website will be published at http://www.sandbox-it.com. The objective, for now, is to effectively run tests with users and analyse the results of such tests for this research. At this stage, no orders can or will be actually fulfilled by this website. Figure 6.19 displays a screenshot from the above fold of the designed e-commerce website, the full length of the page can see found in appendix 15.



Figure 6.19. The test website homepage from a desktop computer. (Sandbox 2014)

The test website presents the shopping cart on its header, using darker colours to call users' attention, while keeping it easily accessible, since users expect the shopping cart to be located near the top of the page. The menu bar has been collapsed and placed right below the company's logo, in the middle of the page, also making is easy to be spotted and accessed. The categories section has been rearranged in order to present its contents in a more mobile-friendly way, with carousels to aid navigation through the products and a set of accordions to easily toggle categories open or closed.

The lower half of the screen presents products recommended to the users on a carousel that rotates automatically but can be controlled using navigation buttons or swiping the screen using a finger. The difference in styling, plus the header of this section, calls users' attention while still making the section look like it belongs to the page, since dissonant elements can be interpreted as advertisements and be ignored by the users. The footer has been rearranged to keep the same functionalities as the desktop version, although in a more compact way, to prevent extensive scrolling.

As previously mentioned, the test website uses responsive design, so the same page that is loaded for desktop computers is also loaded for mobile phones and tablets. However, some modifications have been made to the page. Figure 6.20 shows the first two folds of the test website accessed from a mobile phone and appendix 16 shows the page in its entirety.

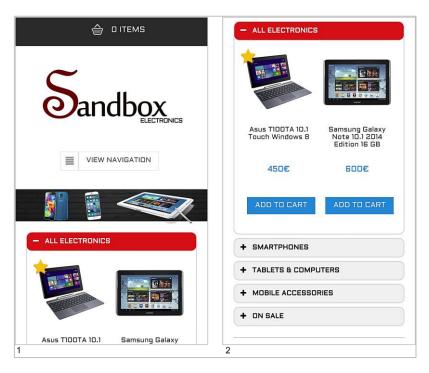


Figure 6.20. First two folds of the test website homepage from a smartphone device. (Sandbox 2014)

Despite the adjustments for better fitting on a smaller screen, all important functionalities and information have been kept on the mobile version; only the sidebar on the right has been removed due to size limitations and because of the advertising character of its contents.

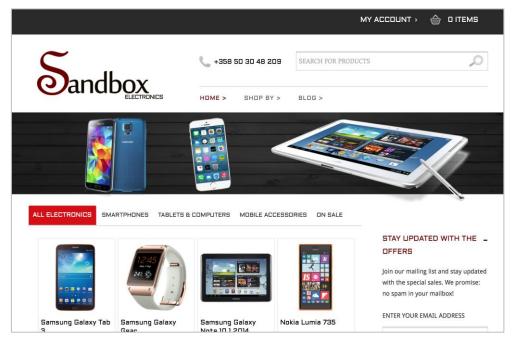


Figure 6.21. Test website homepage as seen from a tablet device. (Sandbox 2014)

As seen on figure 6.21, the website looks very similar from the desktop version when viewed on a tablet; despite smaller changes in the typography and positioning of elements, all functionalities from the desktop website are present in the tablet version in landscape mode. A screenshot with the full length of the test website on a tablet device can be seen in appendix 17.

# 6.5 Testing and evaluating

The testing part of this research has been done by combining heat-map technology, heuristic evaluation and usability testing. Crazy Egg click-tracking tool was used to track users' clicks on the website (Crazy Egg 2014). The results from the test website are displayed with heat maps, which give a good visual insight on site performance, pointing out which areas of the website and hyperlinks users click the most. The tool does not present, however, information about gazing points; only clicks are registered to the heat map.

Crazy Egg tracked 178 visits to the sample website and a total of 407 page views, over a period of 22 days. As seen on the left image of figure 6.22, the click map, the users clicked on almost every object of the sample website, which means that very little content was ignored. The first clicks are displayed with blue colour, and the more the users clicked on the same spot, the brighter the colour became. The right side of figure 6.22 shows the scrolling map; areas marked in white are those where the users have scrolled most and blue are the areas visited the least. For a more detailed view of both images, please see appendices 18 and 19.

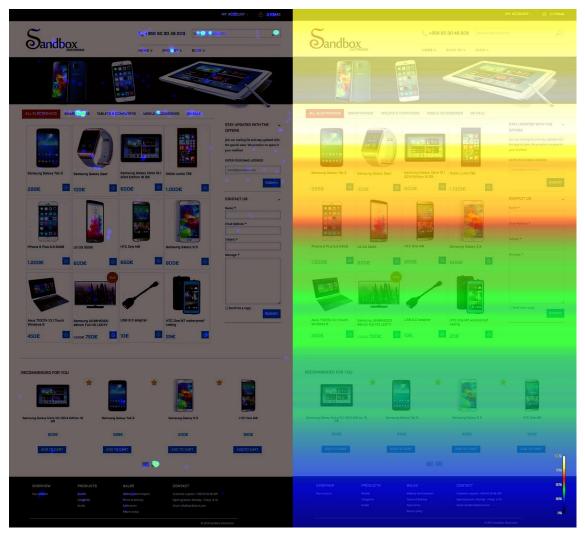


Figure 6.22. Sandbox click map image on the left and scrolling map image on the right. (Crazy Egg 2014)

Figure 6.23 shows the page views sorted by country. As expected, Finland has the highest number of views, as most of the tests were conducted locally, although friends and family members in Brazil, Japan and Germany have also accessed the website, regardless of being invited to the usability tests. Some users configure their systems to prevent tools like Crazy Egg to detect their current location; hence, 21 page views were marked as unknown.

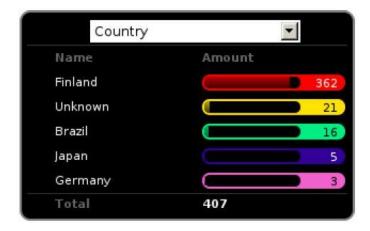


Figure 6.23. List of page views divided by country. (Crazy Egg 2014)

The list of page views organized by device type shows that most users accessed the website using desktop computers, as seen on figure 6.24. This means that most of the users that accessed the website without taking part of the usability tests still preferred using desktop/laptop computers to access the sample website.

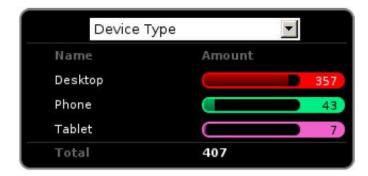


Figure 6.24. List of page views divided by device type. (Crazy Egg 2014)

Desktop users accessed the website either from a Windows operating system, where computers using the NT family, such Windows Server 2003 and 2008, scored the largest number of page views. OS X, the operating system found on iMacs and MacBooks, came after that. Android was the most-used mobile operating system to access the website, with 40 out of the total 43 page views on smartphones. The full list is seen on figure 6.25.

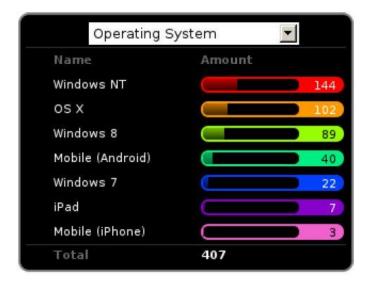


Figure 6.25. List of page views divided by operating system. (Crazy Egg 2014)

Finally, Crazy Egg also detected the window width of the browsers used when accessing the sample website, divided in intervals of 100 pixels each. The largest screen width measured lies within 1900 and 2000 pixels, and also scored the largest number of page views, with 118. Browsers with screen width within 300 and 400 pixels, a common screen width for mobile devices, scored fourth. The full list can be seen on figure 6.26.

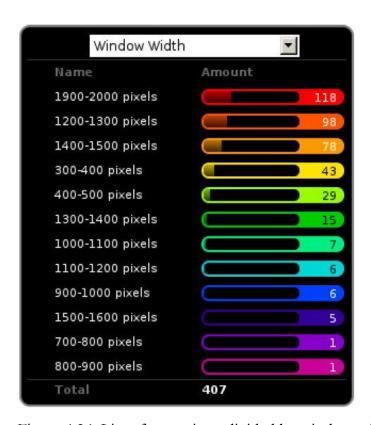


Figure 6.26. List of page views divided by window widths. (Crazy Egg 2014)

Google Analytics, which presents different numbers as it was setup one week later than Crazy Egg, was used to detect which pages were most accessed by users that explored the website beyond the home page. After "my account" page, which many test users ended up visiting as part of one of the tasks in the usability tests, the Samsung LED TV that was marked as on sale received the most visits, suggesting that the promotion was successful in calling users' attention. Figure 6.27 shows the six most-visited pages.

Top Pages	Visits
Sandbox Electronics	167
My Account   Sandbox Electronics	17
Samsung UE48H5000 48inch Full HD LEDTV   Sandbox Electronics	15
Products   Sandbox Electronics	13
Cart   Sandbox Electronics	10
Samsung Galaxy S 5   Sandbox Electronics	6
1 2 3 4	

Figure 6.27. The six most-visited pages in the sample website. (Google Analytics 2014) Heuristic evaluation and usability test analysis uncovered the problem areas the test subjects found on the test website; all problems have been discussed and will be in the near future implemented into the website. According to Jacob Nielsen, five test participants would be enough for a usability test; however, in order to achieve more accurate results, ten users performed tests for this research study.

# 6.5.1 Usability testing – desktop computers

The main purpose of usability testing is to find errors and usage problems at an early stage, and correct them before the website is online. Usability testing, however, can be done at any stage, for example to boost web traffic on an e-commerce business site.

Usability testing for this research study was done by seating the test users in front of a desktop computer with the designed testing website open. The participants were first asked questions 1-20 from the test questionnaire, regarding the usage and preferences of

Google's search engine and e-commerce business websites in general, while the log keeper was taking notes of their answers.

The next step was to test the designed test website, where the users were asked to perform various tasks on the e-commerce website while thinking aloud. The facilitator asked one question at a time from the usability-testing table, while observing test subjects' behaviours. The log keeper took notes while listening to the test users problems and remarks about the site. The last step of the desktop usability testing was to ask the remaining questions from the test questionnaire, questions 21-25, regarding the testing website. The test questionnaire can be found in appendix 20.

Table 1. Desktop usability testing table shows information about the test participants, the usability questions used during the desktop computer website testing, a complete result list from the test, as well as a list of proposed changes for the website. A complete list of the usability-testing outcome can also be found in chapter 7, research results for desktop computers.

Which users:	10 test subjects, ages 15-74
IT knowledge:	Basic to professional IT knowledge. Both familiar
	and unfamiliar with online shopping
Finding test users:	Friends, family, classmates
Test site:	Home
Facilitator:	Direct contact with test subjects
Computer	Desktop computer
Log keeper:	Observing test users, taking notes
Test tasks:	T01: Find shopping cart
	<b>T02</b> : Find main menu
	T03: Find categories
	<b>T04</b> : Choose product of your choice and try to add
	to cart
	T05: Find and click on the company logo
	<b>T06</b> : Choose product of your choice and try to find

it in the category it belongs **T07**: Find your account **T08**: Find customer support number **T09**: Find panel "recommended for you" **T10:** Interact with recommended products Defect / Result list: **R001**: Shopping cart icon confusing when searching for shopping cart at header **R002**: Euro sign below the product picture is ugly and unclear **R003**: Recommended slider slides automatically back to beginning when reaching the last product on the panel **R004:** Customer support number at header confusing; icon does not clearly state what the number is about **R005:** Search suggestions are missing when searching for products **R006:** Product picture holder changes when hovering over, annoying the user **R007:** Recommended product panel is hard to see; not distinctive enough from the rest of the content **R008:** Product filtering options are missing **R009:** Product ratings are missing List of proposed changes: **C001**: Use a different icon for shopping cart C002: Euro sign needs smaller font **C003**: Change how recommended slider acts when reaching the last product C004: Add lines and colour to recommended slider and make it more distinctive from the rest of the page content C005: Add "Customer Support" text below cus-

tomer support number

	C006: Add search suggestions to search bar
	C007: Change picture frame behaviour when hov-
	ering; make it static
	C008: Add product filtering options on the left
	panel
	C009: Add option for product rating
Presenting tasks:	Task instructions given spoken by the facilitator
Start-up state:	Testing website desktop home page open
Tester instruction & Test	
method:	Short instructions to the prototype, test subjects are
	asked to think aloud about what happens and about
	the problems encountered while completing tasks
Data collection:	Written notes by the log-keeper
Debriefing:	Positive user experience
	Negative user experience and possible improve-
	ments
	Test subjects thoughts on missing functionalities
	Usability rating from 1-5
Time planning:	
Welcome and intro:	10 min
Test tasks:	20 min
Debriefing:	10 min
Reporting and analysis:	20 min
Total one user:	1 h
Total all:	10 h

## 6.5.2 Usability testing – mobile devices

A very similar testing structure from desktop computers has been used when testing for mobile devices; the same participants have been used for both tests. After completing the desktop testing questionnaire, the testers provided the participants with a smartphone with the designed test site open and the facilitator asked one question at a

time from the usability-testing table for mobile, while observing subjects' behaviours. After that, test subjects were asked the remaining questions from the questionnaire, questions 26-30, related to mobile usability testing.

Table 2. The mobile usability testing table shows a summary about the test subjects' age group, IT skills and relation of the subjects with the testers, the usability tasks used to perform the mobile website testing, as well as the consolidated result list and changes proposed to each of the results.

Which users:	10 test subjects, ages 15-74		
IT knowledge:	Basic to professional IT knowledge. Both familiar		
	and unfamiliar with online shopping		
Finding test users:	Friends, family, classmates		
Test site:	Home		
Facilitator:	Direct contact with test subjects		
Computer	Mobile devices: Tablet and Smartphone		
Log keeper:	Observing test users, taking notes		
Test tasks:	<b>T01</b> : Find shopping cart		
	T02: Find main menu		
	T03: Find categories		
	<b>T04</b> : Choose product of your choice and try to add		
	it to cart		
	<b>T05</b> : Find and click on the company logo		
	<b>T06</b> : Choose product of your choice and try to find		
	it in the category it belongs		
	<b>T07</b> : Find your account		
	T08: Find customer support number		
	T09: Find panel "recommended for you"		
	T10: Interact with recommended products		
Defect / Result list:	<b>R001</b> : Shopping cart icon confusing when searching		
	for shopping cart at header		
	<b>R002</b> : Euro sign below the product picture is ugly		

	and unclear
	R003: Recommended slider slides automatically
	back to beginning when reaching the last product
	on the panel
	R004: Main menu title is unclear
	R005: Company logo takes too much screen space
	R006: "Your account" not easily accessible
	R007: Too much spacing between product picture,
	price and button "add to cart"
	<b>R008:</b> Search function is missing
List of proposed changes:	C001: Use a different icon for shopping cart
	C002: Euro sign needs smaller font
	C003: Change how recommended slider acts when
	reaching the last product
	C004: Change title of main menu
	C005: Reduce size of company logo
	C006: Add link "your account" to the menu
	<b>C007:</b> Reduce size of the product boxes
	C008: Implement search function to mobile opti-
	mization
Presenting tasks:	Task instructions given spoken by the facilitator
Start-up state:	Testing website mobile home page open
Tester instruction & Test	
method:	Short instructions to the prototype, test subjects are
	asked to think aloud about what happens and about
	the problems encountered while completing tasks
Data collection:	Written notes by the log-keeper
Debriefing:	Positive user experience
	Negative user experience and possible improve-
	ments
	Test subjects thoughts on missing functionalities
	Usability rating from 1 – 5

Time planning:

Welcome and intro: 10 min

Test tasks: 20 min

**Debriefing:** 10 min

Reporting and analysis: 20 min

Total one user: 1 h

Total all: 10 h

#### 6.5.3 Heuristic evaluation

After usability testing had been done with all test participants, the heuristics problems pointed out during sessions had been separated and described in the heuristic analysis. Furthermore, the research authors looked once more at the test website using common sense and keeping in mind the 20 heuristics rationale guidelines. The problems encountered were then added to the heuristics table.

The 20 guidelines used for heuristics rationale have been implemented by Weinschenk and Barker after researching from various sources such as Nielsen, Apple and Microsoft in 2000 (Sauro 2011). The severity numbering system goes from moderate (1) to severe (5). All issues found by the test subjects are considered valid problems and will be implemented into the e-commerce webpage at a later stage.

#### Heuristics rationale guidelines:

- 1. **User Control**: The interface will allow the user to perceive that they are in control and will allow appropriate control
- 2. **Human Limitations**: The interface will not overload the user's cognitive, visual, auditory, tactile, or motor limits
- 3. **Modal Integrity**: The interface will fit individual tasks within whatever modality is being used: auditory, visual, or motor/kinaesthetic
- 4. **Accommodation**: The interface will fit the way each user group works and thinks
- 5. Linguistic Clarity: The interface will communicate as efficiently as possible

- 6. **Aesthetic Integrity**: The interface will have an attractive and appropriate design
- 7. **Simplicity**: The interface will present elements simply
- 8. **Predictability**: The interface will behave in a manner such that users can accurately predict what will happen next
- 9. **Interpretation**: The interface will make reasonable guesses about what the user is trying to do
- 10. Accuracy: The interface will be free from errors
- 11. **Technical Clarity**: The interface will have the highest possible fidelity
- 12. Flexibility: The interface will allow the user to adjust the design for custom use
- 13. Fulfilment: The interface will provide a satisfying user experience
- 14. **Cultural Propriety**: The interface will match the user's social customs and expectations
- 15. **Suitable Tempo**: The interface will operate at a tempo suitable to the user.
- 16. **Consistency**: The interface will be consistent
- 17. **User Support**: The interface will provide additional assistance as needed or requested
- 18. **Precision**: The interface will allow the users to perform a task exactly
- 19. **Forgiveness**: The interface will make actions recoverable
- 20. **Responsiveness**: The interface will inform users about the results of their actions and the interface's status. (Sauro 2011.)

Table 3. Problems encountered during desktop computer, smartphone and tablet tests.

#### Heuristic Evaluation Problem Severity **Details** Heuristics 1 Main menu but-1+4+7+13 4 Brief Description: Customer cannot find the main menu tons are too small and unclear bar Likely Difficulties: Customer is confused about the web shop Specific Context / Location:

				Header Possible Solutions: Increase text font Heuristic Rationale: 1) User Control 4) Accommodation 7) Simplicity 13) Fulfilment
2	No direct customer service calling button	2+4	3	Brief Description:  The user has to type the customer number instead of pressing on the calling icon and get redirected to a voice-call service  Likely Difficulties:  The user gets annoyed  Specific Context / Location:  Header / Footer  Possible Solutions:  Implementing an automated button  Heuristic Rationale:  2) Human Limitations  4) Accommodation
3	Registration but-	1+7+13	5	Brief Description: Online shopper does not know that
	ton comusing			My Account button leads to registration  Likely Difficulties:  Shopper thinks it is necessary to write personal information every time when placing an order

				Specific Context / Location: Header Possible Solutions: Create a registration button next to My Account Heuristic Rationale: 1) User Control 7) Simplicity
				13) Fulfilment
4	No checkout button	1+7+13	4	Brief Description: User is unsure about the checkout procedure Likely Difficulties: The online shopper might not place an order Specific Context / Location: Header Possible Solutions: Write checkout together with the shopping cart icon Heuristic Rationale: 1) User Control 7) Simplicity 13) Fulfilment
5	No automated e-mail link	2+4	4	Brief Description:  User has to open an e-mail service and type in customer service e-mail  Likely Difficulties:  User might get annoyed and switch to a more convenient e-commerce site

				Specific Context / Location: Footer Possible Solutions: Implementing an automated link Heuristic Rationale: 2) Human Limitations 4) Accommodation
6	Black website colour	4+13+14	4	Brief Description: Western and Indian culture perceive black colour as negative Likely Difficulties: Users from Western and Indian culture might not want to shop at the e- commerce site Specific Context / Location: Basic layout Possible Solutions: Designers need to assess their audience and change layout colour to purple or yellow if needed Heuristic Rationale: 4) Accommodation 13) Fulfilment 14) Cultural propriety
7	No search sug- gestions	8+9+13	3	Brief Description: Users have to complete the full search text without receiving suggestions Likely Difficulties: Lack of suggestions might annoy users Specific Context / Location:

				Header Possible Solutions: Implementing search suggestions Heuristic Rationale: 8) Predictability 9) Interpretation 13) Fulfilment
8	No product ratings	13	3	Brief Description:  Products do not present ratings based on other users' feedbacks Likely Difficulties:  Users might decide not to buy a product because of the lack of ratings Specific Context / Location:  Basic layout Possible Solutions: Implement ratings on products Heuristic Rationale:  13) Fulfilment
9	No product filtering options	1+4+9 12+13	5	Brief Description:  Customer does not have the options to filter when searching for products Likely Difficulties:  Customer gets overwhelmed with too many products to look through Specific Context / Location:  Main page Possible Solutions: Implementing search filter option Heuristic Rationale:

				1) User Control
				4) Accommodation
				9) Interpretation
				12) Flexibility
				13) Fulfilment
10	Recommended	7	3	Brief Description:
	product panel			Recommended product panel is hard
	hard to see			to find because it does not stand out
				from the rest of the page content
				Likely Difficulties:
				Customer cannot see recommenda-
				tions from the e-commerce page
				Specific Context / Location:
				Main page
				Possible Solutions:
				Add colours or lines around the panel
				Heuristic Rationale:
				7) Simplicity
				,
11	Mobile version	1+4+9	5	Brief Description:
	has search func-	12+13		Product search option is missing from
	tion missing			the website when connecting with mo-
	O			bile devices
				Likely Difficulties:
				Customer does not have the option to
				search for products
				Specific Context / Location:
				Main page
				Possible Solutions:
				Implementing search bar for mobile
				implementing scarcii bai foi mobile

optimization

Heuristic Rationale:

- 1) User Control
- 4) Accommodation
- 9) Interpretation
- 12) Flexibility
- 13) Fulfilment

#### 6.6 Analysing cultural differences

The page of the Central Bank of Iraq is very simple structured and has little colour, there are no pictures of humans displayed; instead, an illustration of an ancient wall painting and a picture of banknotes. Besides the painting and the white background, there are only shades of blue and grey, blue being the colour for spirituality and protection in the Middle East.



Figure 6.28. Central Bank of Iraq in Arabic language. (Cbi 2014)

The English version of the website has the vertical navigation bar on the left side of the page and the Arabic language page has the bar on the right side. Figure 6.28 displays the website in Arabic language while figure 6.29 underneath shows the same website in English.



Figure 6.29. Central Bank of Iraq in English language. (Cbi 2014)

Having many branches and websites all over the world, the multinational company Ikea is a great example of how culture influences the layout of a website. While most of the international company webpages display pictures of women to complement their home appliances, sites from Saudi Arabia blur out the women appearing on their pages.

Figure 6.30 shows part of Ikea's e-commerce website from the United States, with a picture of a few people sitting around a table, with three of the women being clearly visible, and figure 6.31 shows the Arabic site, where only the woman's silhouette in the picture can be recognized. Both websites have very similar layout, except that the Arabic page seems to be a mirror image of the English site. Due to the fact that Arabs write from right to left, and not like traditional Westerners from left to right, everything is aligned to the right side of the page.



Figure 6.30. Ikea homepage in the United States. (Ikea 2014a)



Figure 6.31. Ikea homepage in Saudi Arabia. (Ikea 2014b)

### 7 Research results

This chapter is about the results found while conducting this research study. It demonstrates the results found during the testing part of the designed e-commerce site from desktop computers and mobile devices as well as the results found when analysing eBay, Amazon and Google's search engine. Furthermore, it shows a list of results found during the theoretical part of this research study, both for desktop computers and mobile devices.

## 7.1 Result findings for desktop computers

The research study about desktop computers found out that there are some simple design elements that users look for when browsing through the web, especially when it comes to online shopping or searching for keywords on Google's search engine. The following points tell about basic web standards for layout, elements that web users like, elements that annoy or hinder browsing and specific facts for designing e-commerce websites.

According to the findings throughout this research study, basic web standards for page layout that users look for are:

- Home button should be found at the top-left part of the page
- Company logo should be at the top-left corner
- Search field should be placed at the top-right part of the page
- Shopping cart icon would be expected at the top-right corner
- Login button should be at the upper-right area
- Utility navigation belongs at the very bottom of the page and should be designed visually weaker than the rest of the page
- Menu should stand out with colour or graphics and be placed horizontally at the top area
- Different sections of a webpage should be clearly visible by white space, colour or borders
- Headers for different sections should stand out
- Nothing should look clunky or remind of advertisements.

Design elements that seem to especially attract web users' eyes:

- Plain text broken in sections with enough white space surrounding them
- Attractive and smiling faces
- Real-looking people
- Good-quality images.

A few elements that frequently annoy web users while browsing through websites and should be avoided if possible are:

- Fixed image sizes for small images; the user wants to have the option to expand product pictures
- A wall of text overwhelms the user
- Images that look like advertisement are many times overlooked by the user
- Bad-quality images can misinform the user about the quality of a product
- Unattractive people do not call online shoppers' attention
- Too little white space makes it hard for the user to read page content
- Unnecessary product information makes the user bored of reading

 Small or non-existing product descriptions can make the user give up on a purchase due to the lack of information.

A few more facts found during this research designers should keep in mind, especially when designing e-commerce websites, are:

- Navigation should be kept simple and functional
- Call-to-action bar should be clearly visible
- Bullets points help for easy reading
- Buttons should be clearly visible
- Bigger product images are a plus for a more detailed view.

The usability test results from testing the designed e-commerce website for desktop computers, seen in chapter 6.4.1, suggest a few changes such as:

- Using a different icon for shopping cart; current icon was confusing
- Euro sign was perceived as being too big; a smaller font would be welcome
- Recommended slider behaviour should be changed; the automatic sliding-back action was disturbing
- Make recommended slider more distinctive from the content and ultimately more visible
- Customer support number was confusing; users would like to have "customer support" text written below the number in order to know what the number stands for
- Adding search suggestions to search bar would make searching faster
- Product picture frames should be made static; picture behaviour when hovering over was confusing
- Adding product filtering option on the left panel would balance the page and make searching for products easier
- Adding the option for product ratings would be appreciated by some of the test users.

The research authors found a few more problems when testing the site using the 20 heuristics rationale guidelines found in chapter 6.5.3:

- The main menu buttons are too small and unclear

- Direct customer service calling button is missing
- Registration button is missing from the main page; user has to go through my account button in order to get to registration
- Checkout button is missing; user has to go to cart in order to be able to check out
- Black website colour could present a cultural issue in Western and Indian culture.

These results indicate that online browsers want to get their tasks done and get results as quickly as possible, instead of having to first figure out how a website works, or even worse, being hindered by useless content or disturbing advertisements.

#### 7.2 Result findings for mobile devices

This research found out that reading complex content on mobile overwhelms users, since the average score on Cloze tests achieved by mobile device testers was less than half of that achieved by desktop computers testers. Objectivity is crucial on smaller screens, and even long news articles featuring side stories will be frown upon by many.

Here are some points that users dislike when reading webpages on mobile devices:

- Users avoid complex content, since they have to memorize content that is not on screen anymore to understand the full context
- Lengthy text, such as in news reports with side stories that do not add to the actual fact, are also frowned upon; users want to "kill time" while not wasting it
- Constant scrolling back and forth through a long text takes attention away from what
  is on screen, making it easier for users to get lost on the page
- Lengthy navigation bars overwhelm users, as they are either too small to be properly read on a small screen or have too many items, impairing comprehension.

The key for mobile-ready websites is to go straight to the point, cutting secondary content that adds too much to the length of a page whenever it does not add to the page's goal; the same principle of quickly scanning through a webpage found in desktop computers' users is valid for mobile users, as well. Sharper pages will load faster and please users more.

Heat-map tests on mobile suggest users tend to fixate their eyes more on the top part of the screen and give most of their attention to the first three viewports of the page. This means that the first four results in Google's search results are the most noticed by the users, since those are within the average two scrolls users do before choosing where to go, and also that ads placed by Google at the top of the page will be noticed by most users.

Business-to-consumer websites should pay attention to their mobile version, as well. The main challenge is to keep all the necessary information for users to analyse and close the deal, while deferring less-important content to secondary pages.

Here are some guidelines that should help developers with this task:

- A separate version designed specifically for small mobile devices should be developed
  if the page is based on adaptive design
- Users should reach the mobile site automatically when typing the site's address on the
  device, and a link to the mobile site should be present in the desktop version page, so
  users can still access the mobile version if redirection fails
- Likewise, a link to the desktop version should be accessible from the mobile page, if
   users need to use features not available on mobile
- Links to the website sent over e-mail or social media should detect the mobile device
   and land users at the requested page, instead of sending them to the website's home
- Essential elements on b2c websites like the shopping cart, categories menu and search fields should be presented at the top of the page, for easy access
- It is a good idea to keep the search box and shopping cart always visible if the page is too long, though the "sticky" header should not take too much space on screen
- Less-important content should be cut out from the mobile website; developers should send such content to secondary pages, to reduce word count and improve loading times
- Responsive design is a good solution to make the website uniform and keep its functionalities optimized across platforms
- Buttons, hyperlinks and text boxes should be large to ensure users will be able to access features from the page without clicking somewhere else inadvertently

Clickable objects like buttons and hyperlinks should stand out from the ordinary text,
 to tell users right away such elements are meant to be clicked.

Tests run on mobile devices for the sample website had similar results of those achieved on desktop computers, as the guidelines described in the theoretical background of this research for mobile are also valid: customers are used to find items that aid shopping at the top part of the website and secondary information on the footer of those pages.

The heuristics rationale applied by the research author has been used for mobile testing as well. Besides the results already mentioned in chapter 7.1, which shows some issues shared between desktop and mobile websites, the mobile version website presented a problem of its own: the absence of a search function, which impairs users trying to find a product on the website.

The results conclude that even when users are browsing the web with time to spare, they do not want to waste time with content that will not add value to the page. Sites with lean text and figures that help users to understand the page are preferred over websites with lengthy content that requires too much scrolling and reading. E-commerce websites should pay special attention to that, by using high-quality images and call-to-action elements easy to find, and large enough to make the user feel comfortable and in control when shopping.

#### 8 Further research

This research study gives a good overall understanding of how people read Google's search engine and e-commerce websites. There are, however, many areas like search engine optimization for e-commerce business where much more research would be needed in order to get the full potential of an online store.

Likewise, smartphones, tablets and mobile networks are in constant evolution, and the more those technologies advance, the more users adopt them as additional means of accessing the Internet, with many people having mobile devices as their only source of

browsing websites. Studies focusing on the technological aspect of mobile devices, detecting strengths and weaknesses of mobile operating systems when it comes to browsing the web, can be beneficial also for developers, who would consider such aspects when creating websites specifically for this audience.

The World Wide Web is a global phenomenon and more research should be done on cultural differences in web design, more specifically on the Chinese ever-growing market. China's e-commerce website Alibaba is amongst the leading online web stores; therefore, it would be vital that the website's usability principles would be researched and analysed. This would give a good overview on how cultural differences could be used as an advantage when designing websites.

The web is constantly changing, and the timespan between major changes is getting shorter and shorter. The same is valid for designing and usability guidelines – although some concepts seem to persist over major technology shifts, other theories need to keep up-to-date with the new tendencies. In such scenario, researches done today might be obsolete two years from now.

Computer screen sizes keep changing rapidly as well and, with that, the website layouts change accordingly. It is important for e-commerce businesses to keep conducting usability tests in order to fulfil online shoppers' needs and wishes.

#### 9 Conclusions

The research findings for desktop computers indicate that users scan through a webpage rather than read thoroughly in a word-by-word manner. Even though designers have little control over personal preferences, it seems that users look for a standard type of webpage that has little text, is clutter-free and easy to use. Drastic changes in layout are not welcome and require a learning curve; the online user wants to have a user-friendly and comfortable feeling while searching for information without getting overwhelmed.

The layout should have the company logo at the top-left corner of the website. The call-to-action buttons, such as shopping cart, account registration and checkout button, belong at the top-right area of the webpage. The search bar should be large enough to make it easier to write as much search information as possible and positioned at the upper-right section of the page, just below the call-to-action buttons, and with enough white space surrounding it to make it clearly visible. White space is also important for easy text reading and it is recommended to keep enough spacing throughout the content of the website.

Overall, the page should be clutter-free and without unnecessary content; it should contain little text and keep a healthy balance between contrast and colours. Advertisement should look like it belongs to the rest of the page content or, if possible, be completely avoided, as it could mislead the user about the seriousness of a company.

The mobile market is growing bigger every year, due to technology improvements on devices and networks. As a consequence, more and more people adopt smartphones and tablets as additional ways of accessing the Internet; in fact, many of them not even use desktop computers for that purpose anymore. Having business-to-consumer websites mobile-ready can give companies the advantage needed in a competitive market, where users hop from one site to another in a matter of seconds if they find that the website is not attractive or easy to use.

Because mobile devices and networks have only recently reached satisfactory features and speeds when comparing to desktop computers, few studies have been conducted in the area so far, though users' behaviours share many features of those from the desktop environment. Websites on mobile should be concise and straight to the point: because users read on average only 120 words before deciding whether to stay or leave the page, the blend between images and text need to be considered to catch the users' attention.

Lengthy content should be avoided whenever possible, with extra information being deferred to secondary pages. Images should be large and clear enough, and call-to-action elements are expected on the top of the page. The smaller screens of smartphones re-

quire buttons, hyperlinks and text fields to be large and well-spaced enough to avoid the "fat finger" problem, when users click accidentally someplace else because of elements that are too close and too small on the screen.

Cultural aspects should also be studied by companies that want to enter different markets. Religion beliefs and popular culture define which colours and images similar societies expect to find when accessing a website, which means that what is attractive for most of the Western world might not be seen with good eyes in the Middle East or in Asian countries. Designers should be well aware of those aspects when choosing a palette of colours and sets of images, and coming up with local websites can be a good idea when the company wants to reach distant markets.

The testing results prove that the guidelines found during the theoretical study, listed in the research results chapter and used to design the testing website, are valid recommendations every designer should use. The overall layout of the e-commerce site was perceived as positive by the test subjects, and they all would consider shopping at this site once the e-commerce page is fully implemented and ready to use. The click map and the scrolling map from chapter 6.5 show that most of the content was seen by the test users, which makes the sample page a good example to follow.

The goal of this research was to evaluate the guidelines for web design found in the literature. Testing was performed by constructing a test webpage and testing it with several users. The objectives were achieved and the results give the reader, as well as the thesis authors, a clear picture that web design is a complex mixture of design, human psychology and coding.

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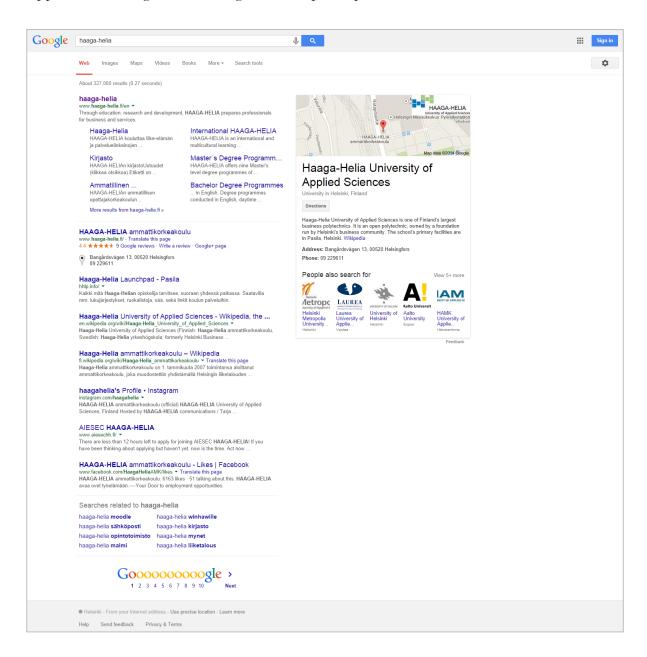
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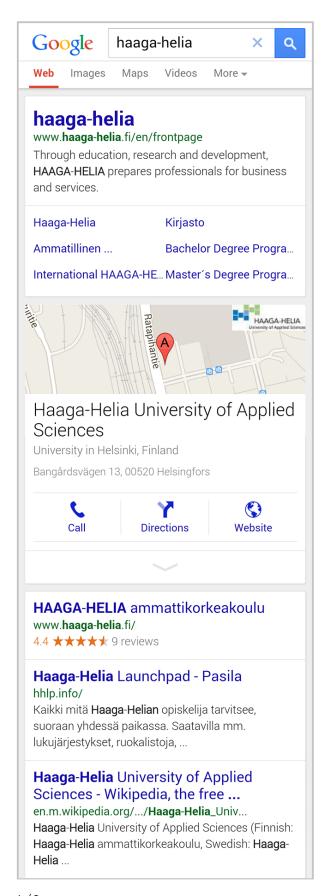
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# **Appendices**

Appendix 1. Google Search Engine desktop computer with search word



Appendix 2. Google Search Engine smartphone with search word



1/2

# **Haaga-Helia** ammattikorkeakoulu – Wikipedia

fi.m.wikipedia.org/.../Haaga-Helia\_amma... Haaga-Helia ammattikorkeakoulu on 1. tammikuuta 2007 toimintansa aloittanut ammattikorkeakoulu, joka muodostettiin ...

#### haagahelia's Profile • Instagram

instagram.com/haagahelia

**HAAGA-HELIA** ammattikorkeakoulu (official) **HAAGA-HELIA** University of Applied Sciences, Finland Hosted by ...

#### AIESEC HAAGA-HELIA

www.aiesechh.fi/

There are less than 12 hours left to apply for joining AIESEC **HAAGA-HELIA!** If you have been thinking about applying ...

#### **HAAGA-HELIA** ammattikorkeakoulu -Likes | Facebook

https://www.facebook.com/HaagaHeliaA... 6163 likes · 51 talking about this. HAAGA-HELIA avaa ovet työelämään.----Your Door to employment opportunities.

Related searches

haaga-helia moodle

haaga-helia sähköposti

haaga-helia opintotoimisto

haaga-helia malmi

haaga-helia winhawille

haaga-helia kirjasto

haaga-helia mynet

haaga-helia liiketalous

Next >

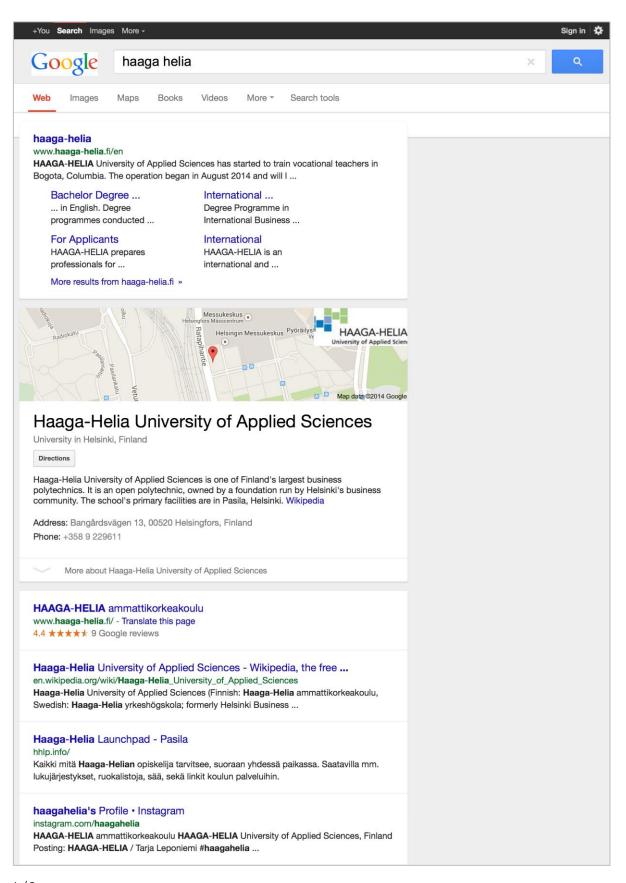
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Sign in

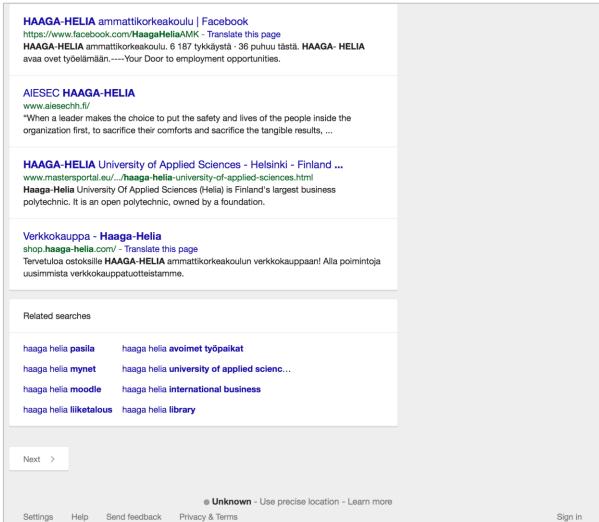
Settings Help Feedback

Privacy & Terms

Appendix 3. Google Search Engine tablet with search word

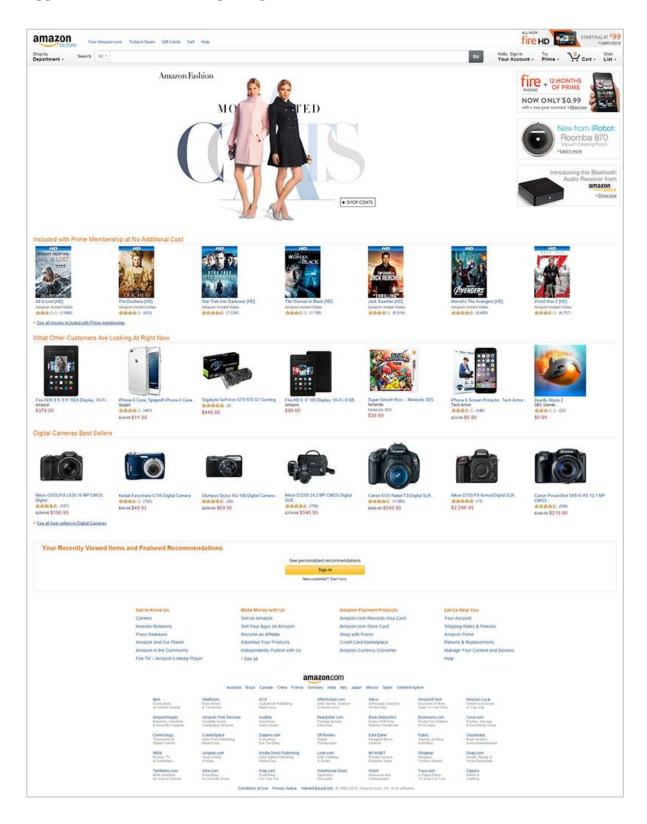


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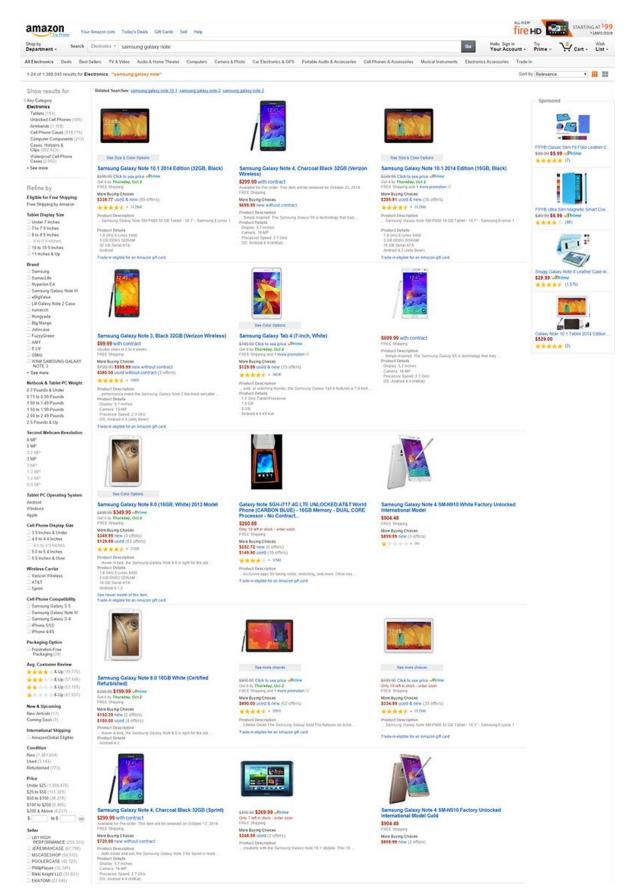


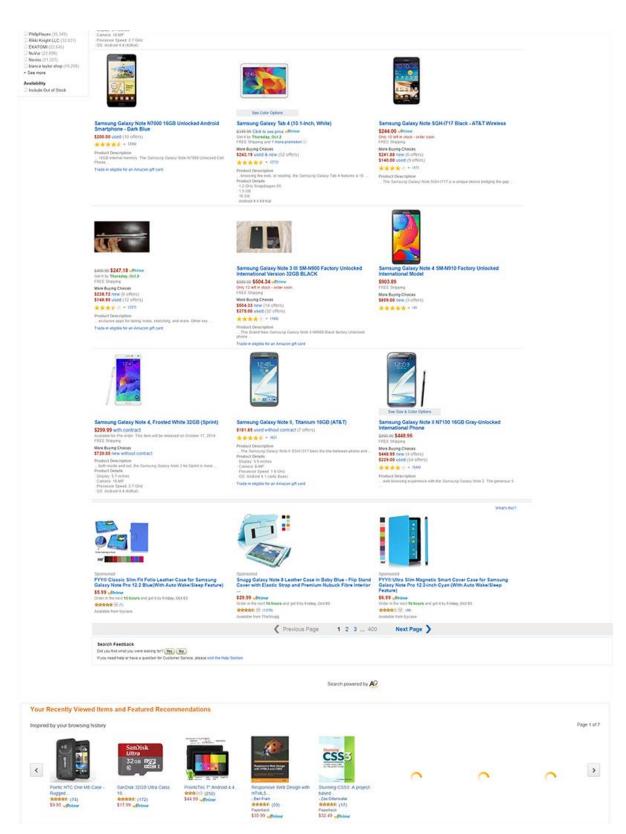
2/2

Appendix 4. Amazon desktop computer without search word

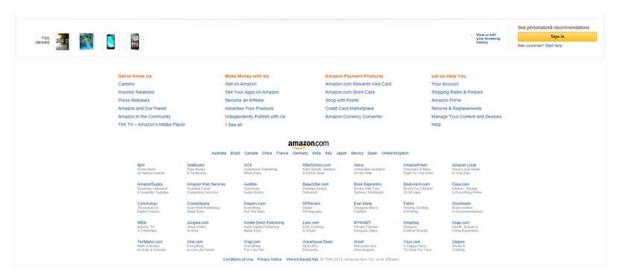


Appendix 5. Amazon desktop computer with search word

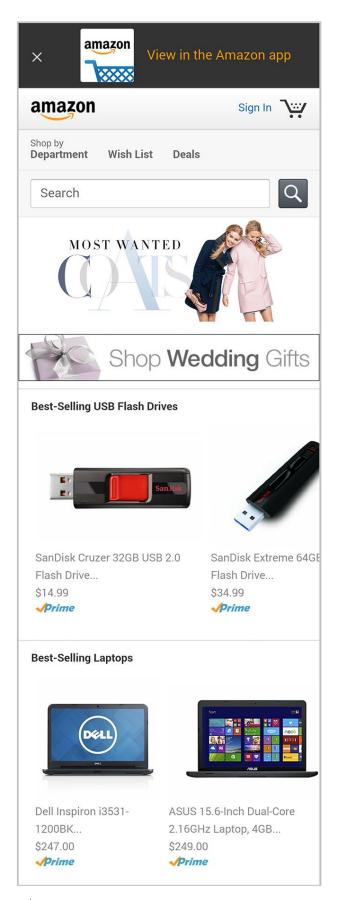


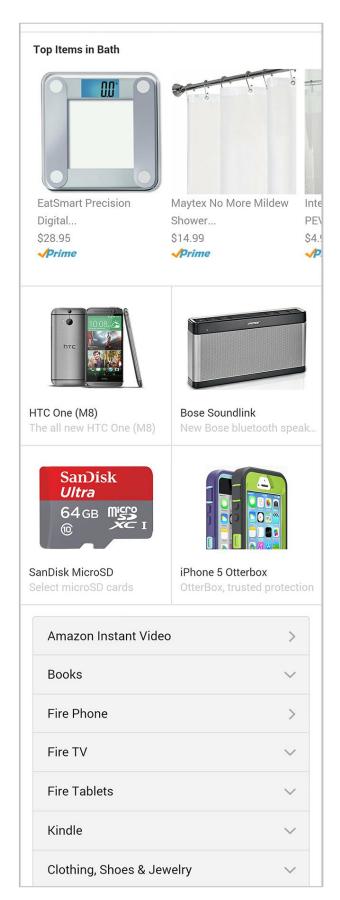


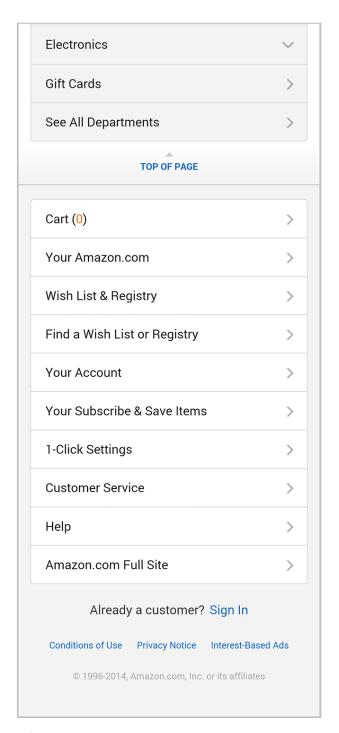
2/3

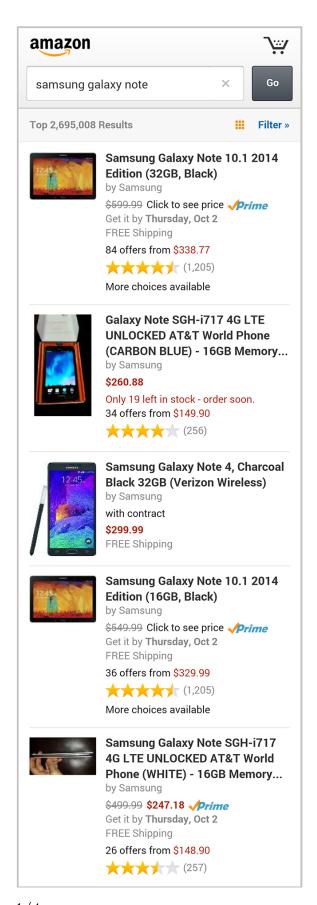


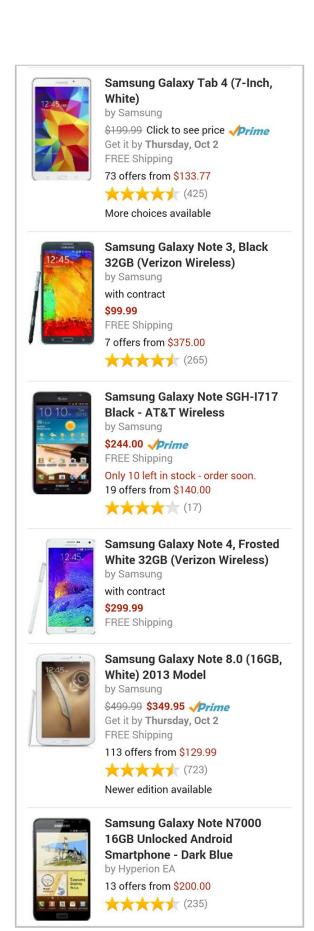
Appendix 6. Amazon smartphone without search word

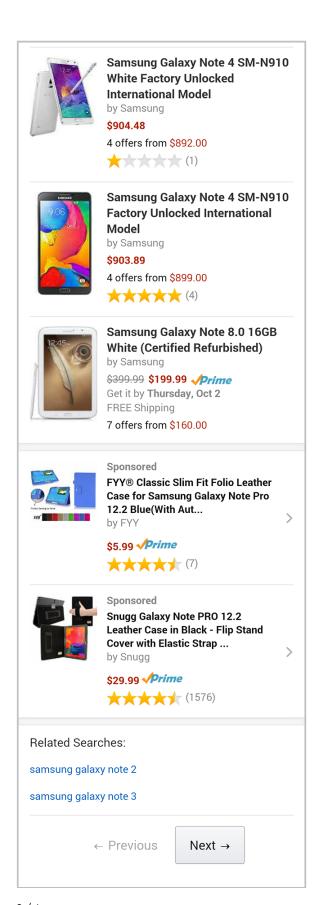


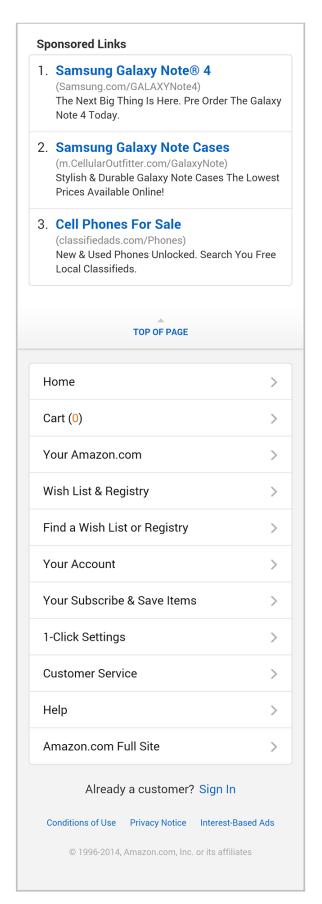




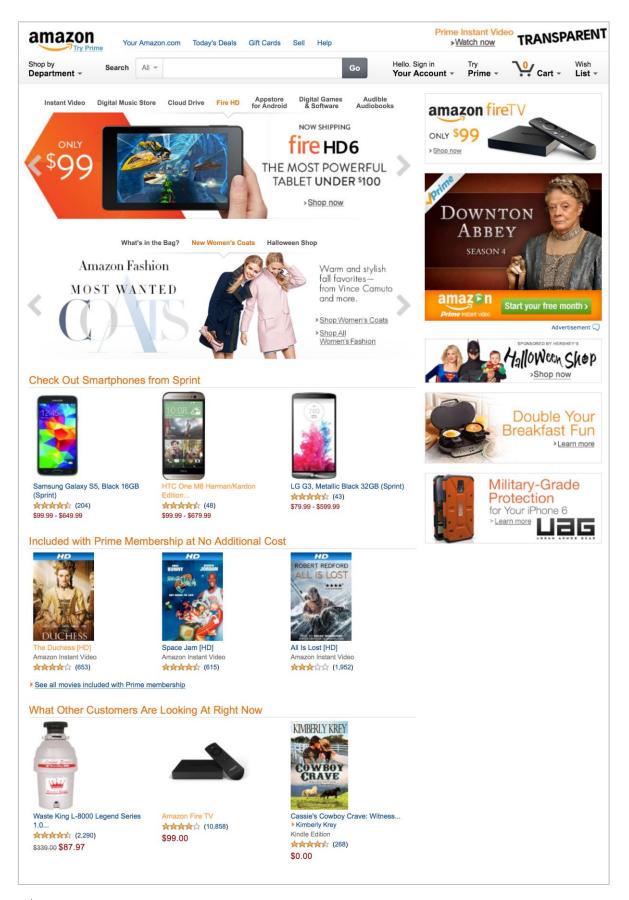






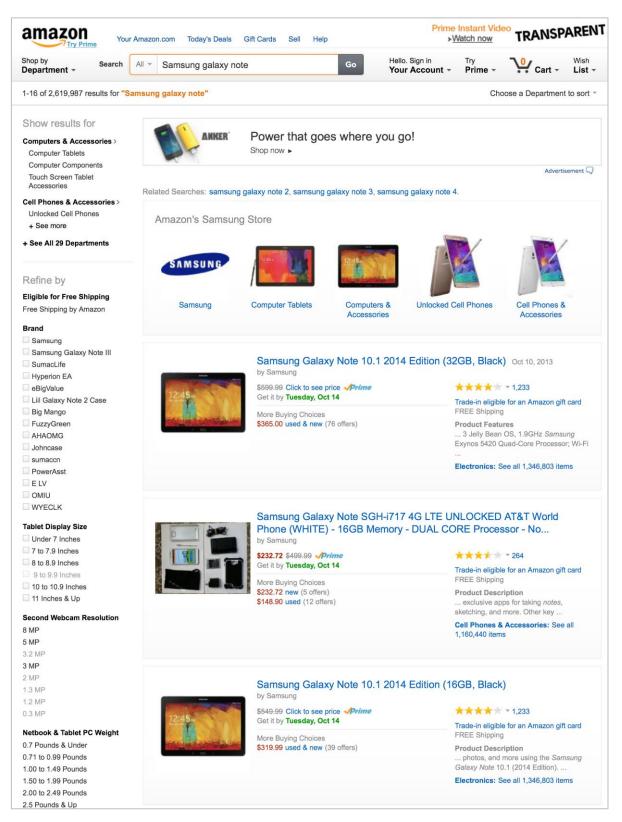


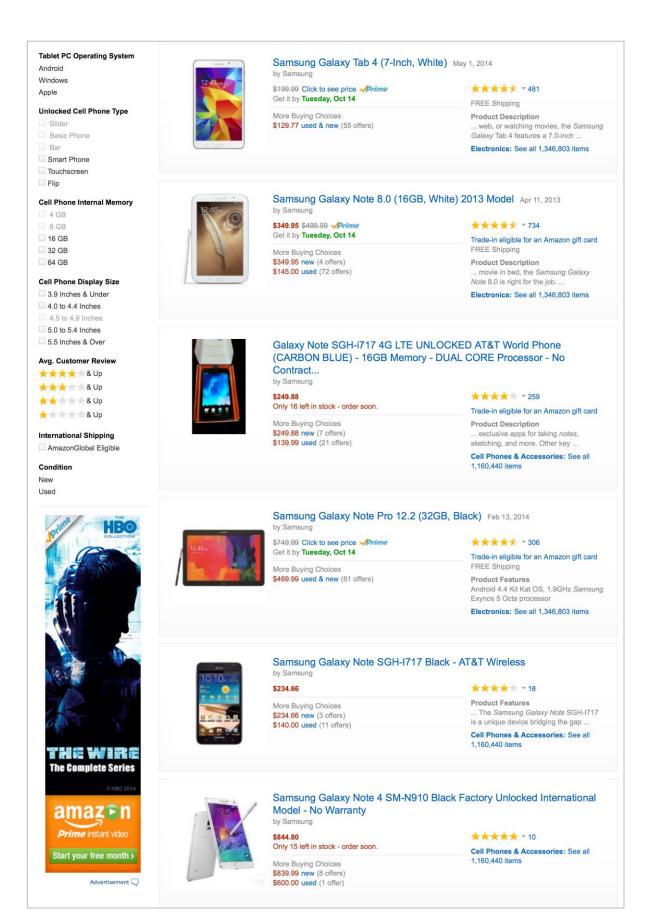
Appendix 8. Amazon tablet without search word

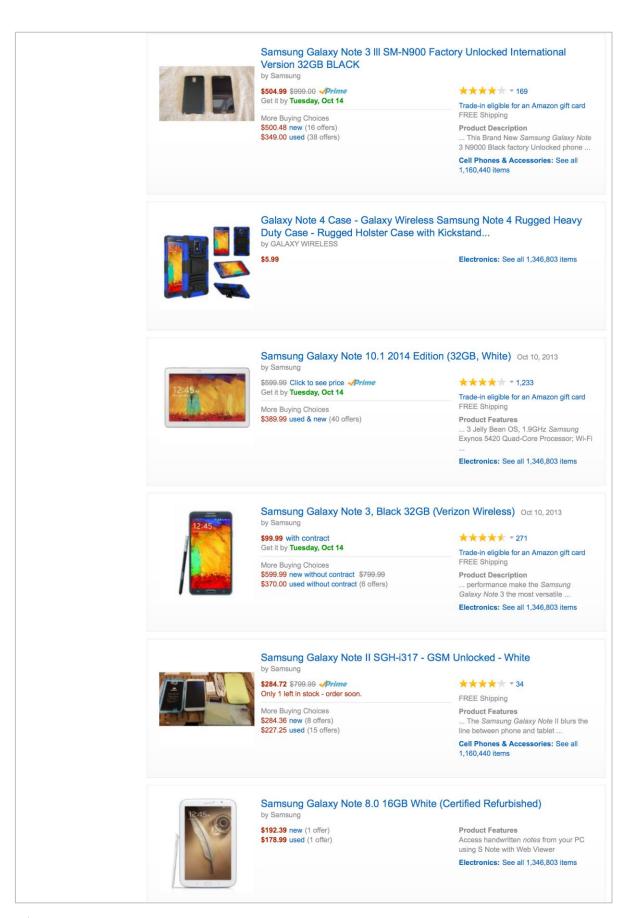


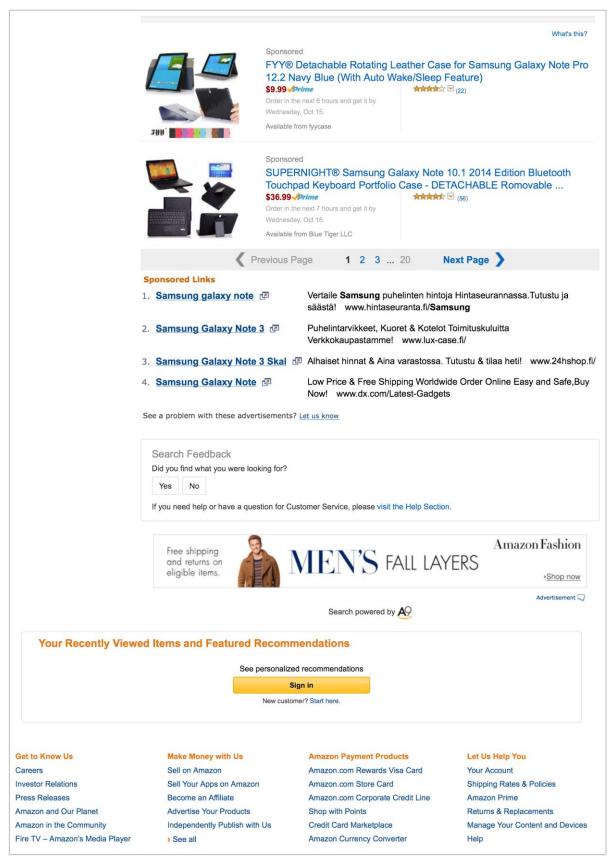
#### Your Recently Viewed Items and Featured Recommendations See personalized recommendations Sign in New customer? Start here. Get to Know Us Make Money with Us **Amazon Payment Products** Let Us Help You Amazon.com Rewards Visa Card Careers Sell on Amazon Your Account Investor Relations Amazon.com Store Card Shipping Rates & Policies Sell Your Apps on Amazon Press Releases Become an Affiliate Amazon.com Corporate Credit Line Amazon Prime Amazon and Our Planet Advertise Your Products Shop with Points Returns & Replacements Independently Publish with Us Credit Card Marketplace Manage Your Content and Devices Amazon in the Community Fire TV – Amazon's Media Player Amazon Currency Converter Help amazon.com Australia Brazil Canada China France Germany India Italy Japan Mexico Spain United Kingdom AfterSchool.com ACX Audiobook Publishing Made Easy AmazonFresh Groceries & More Right To Your Door Alexa Actionable Analytics for the Web AbeBooks Amazon Local & Dance Gear in Your City AmazonSupply Industrial Audible Download Audio Books Book Depository Books With Free Delivery Worldwide Bookworm.com Books For Children Of All Ages BeautyBar.com Amazon Web Services Casa.com Fabric Sewing, Quilting & Knitting ComiXology CreateSpace Indie Print Publishing Made Easy East Dane Designer Men's Fashion Goodreads Book reviews & recommendations Diapers.com DPReview Digital Photography But The Baby Look.com Kids' Clothing & Shoes MYHABIT Private Fashion Designer Sales Kindle Direct Publishing Woot! Discounts and Shenanigans Yoyo.com A Happy Place To Shop For Toys Zappos Shoes & Clothing TenMarks.com Vine.com Wag.com Everything to Live Life Green Math Activities for Kids & Schools Conditions of Use Privacy Notice Interest-Based Ads © 1996-2014, Amazon.com, Inc. or its affiliates

Appendix 9. Amazon tablet with search word



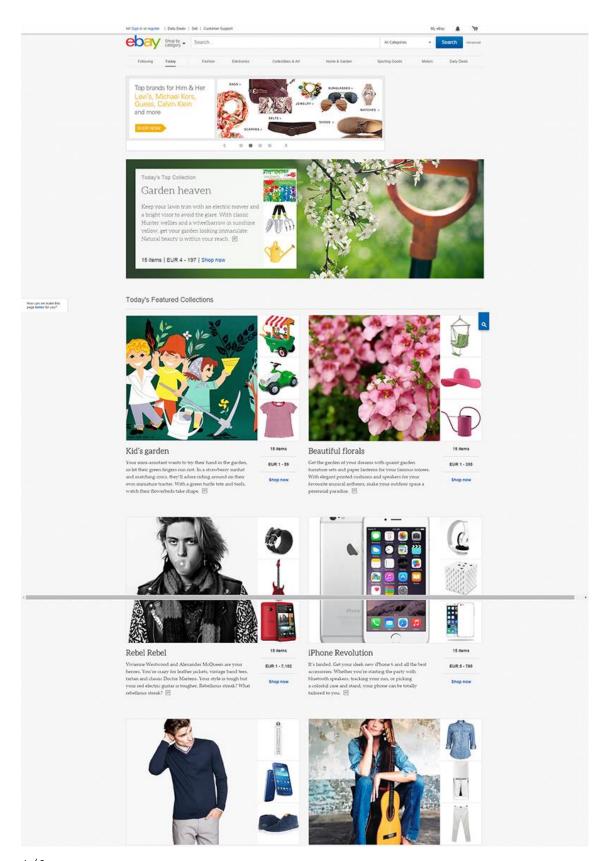


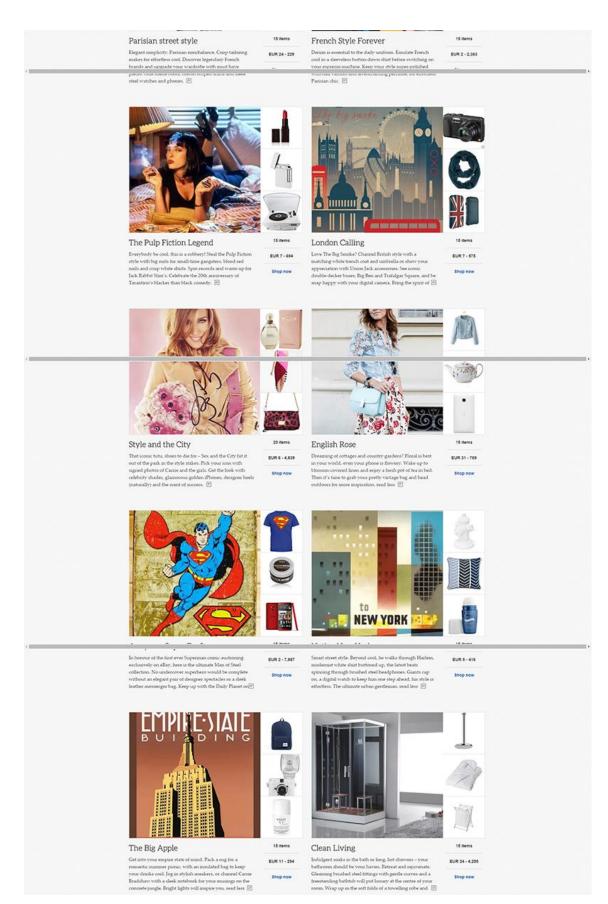


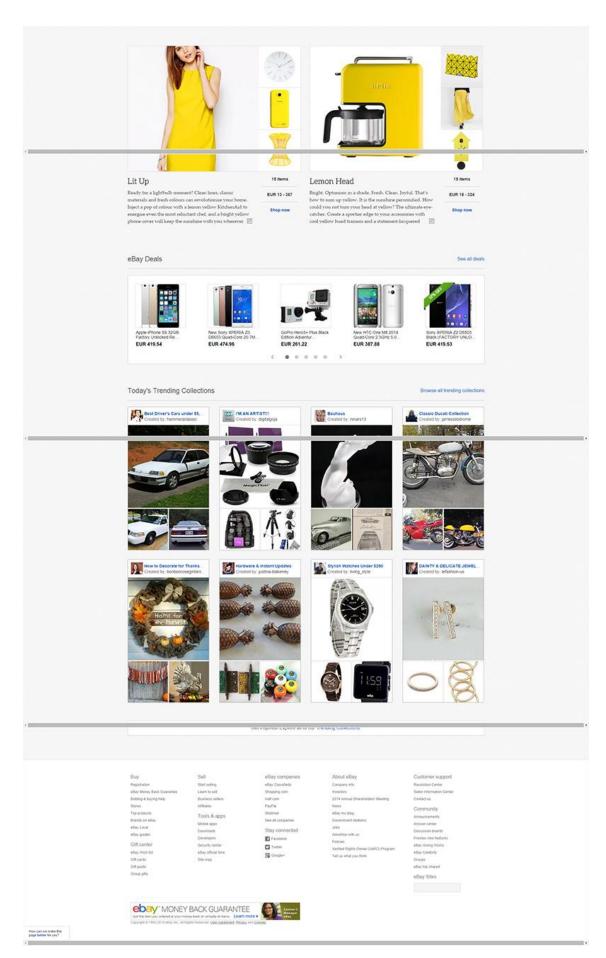


Australia Brazil Canada China France Germany India Italy Japan Mexico Spain United Kingdom						
Score deals	Rare Books	Audiobook Publishing	Kids' Sports, Outdoor	Actionable Analytics	Groceries & More	Great Local Deals
on fashion brands	& Textbooks	Made Easy	& Dance Gear	for the Web	Right To Your Door	in Your City
AmazonSupply	Amazon Web Services	Audible	BeautyBar.com	Book Depository	Bookworm.com	Casa.com
Business, Industrial	Scalable Cloud	Download	Prestige Beauty	Books With Free	Books For Children	Kitchen, Storage
& Scientific Supplies	Computing Services	Audio Books	Delivered	Delivery Worldwide	Of All Ages	& Everything Home
ComiXology	CreateSpace	Diapers.com	<b>DPReview</b> Digital Photography	East Dane	Fabric	Goodreads
Thousands of	Indie Print Publishing	Everything		Designer Men's	Sewing, Quilting	Book reviews
Digital Comics	Made Easy	But The Baby		Fashion	& Knitting	& recommendations
IMDb	Junglee.com	Kindle Direct Publishing	Look.com	MYHABIT	Shopbop	Soap.com
Movies, TV	Shop Online	Indie Digital Publishing	Kids' Clothing	Private Fashion	Designer	Health, Beauty &
& Celebrities	in India	Made Easy	& Shoes	Designer Sales	Fashion Brands	Home Essentials
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Appendix 10. eBay desktop computer without search word

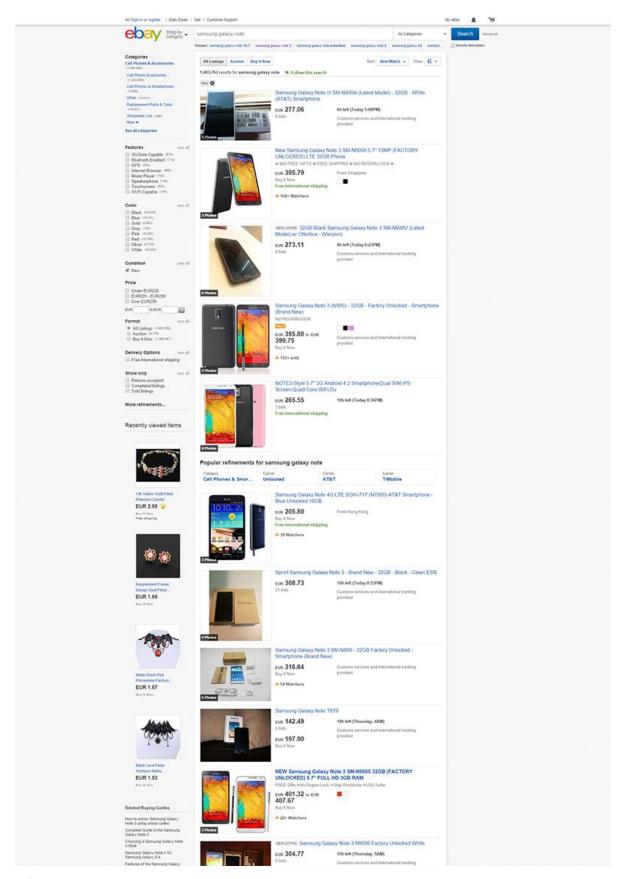


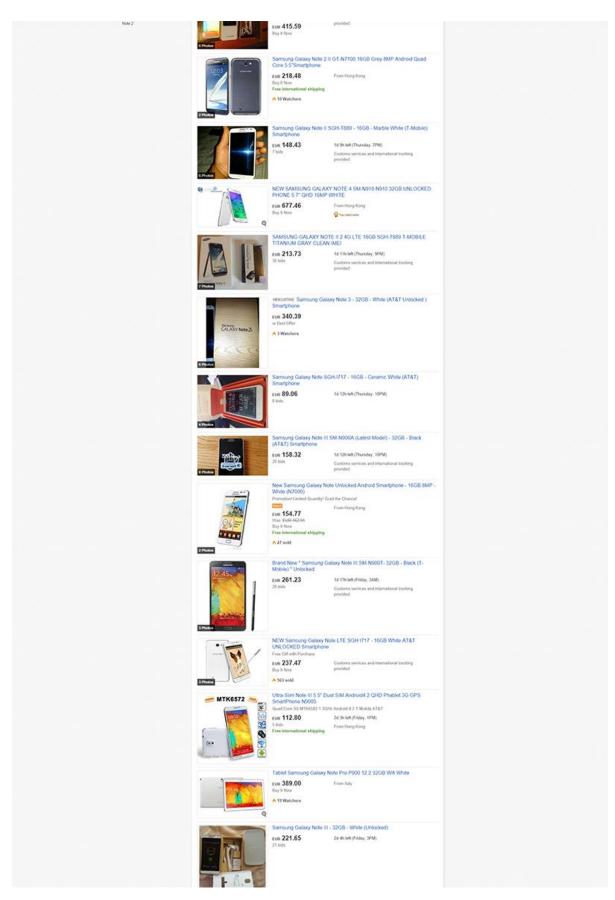


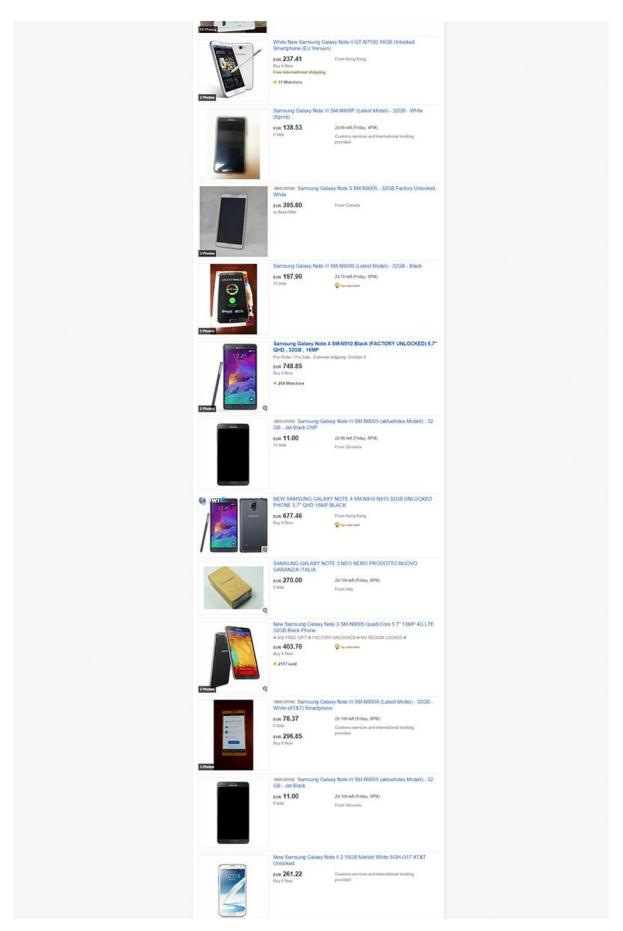


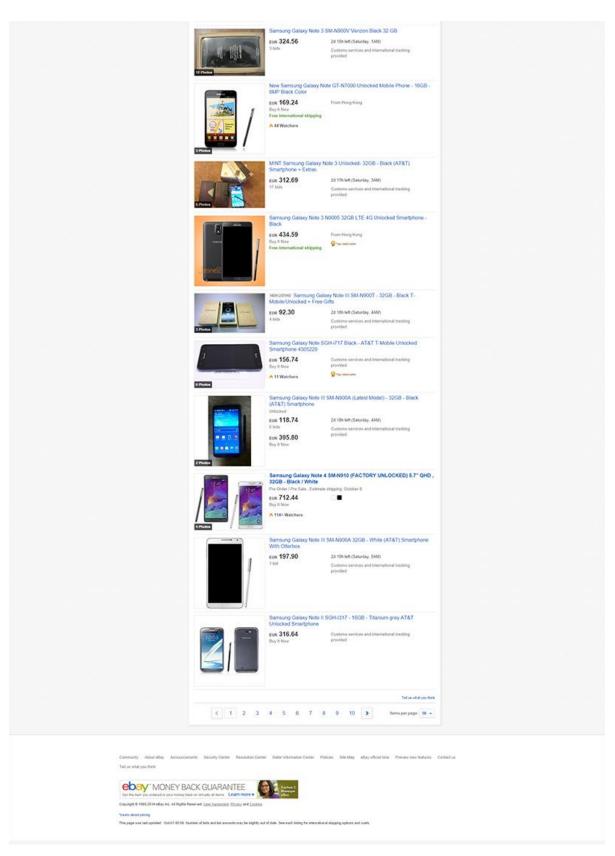
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Appendix 11. eBay desktop computer with search word



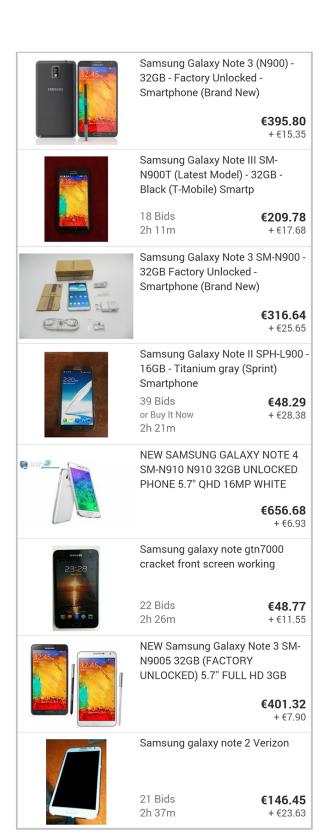






Appendix 12. eBay smartphone with search word





2/4



Samsung Galaxy Note II SCH-1605 -16GB - Marble White (Verizon) Smartphone

> **€126.66** + €21.53



Samsung galaxy note 2 Verizon

11 Bids **€72.04** 2h 40m + €23.63



Samsung Galaxy Note SGH-I717 -16GB - Black (AT&T) Smartphone

3 Bids **€64.12** or Buy It Now + €43.50 2h 42m



Tablet Samsung Galaxy Note Pro P900 12.2 32GB Wifi White

€389.00

+€24.00



Samsung Galaxy Note III SM-N900A (Latest Model) - 32GB -White (AT&T) Smartphone

0 Bids **€197.90** or Buy It Now + €25.63 3h 34m



Samsung Galaxy Note SGH-I717 AT&T (unlocked)

> €118.74 + €15.35 or Best Offer



Samsung Galaxy Note 2 - Cracked screen - clear esn

9 Bids **€89.06** 3h 51m + €20.06



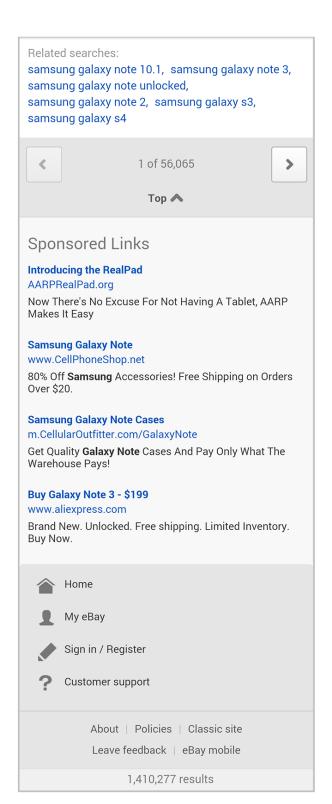
Samsung GALAXY Note 3 SM-N9005 32 GB White Unlocked Smartphone Mobile Poor

> €359.30 Free

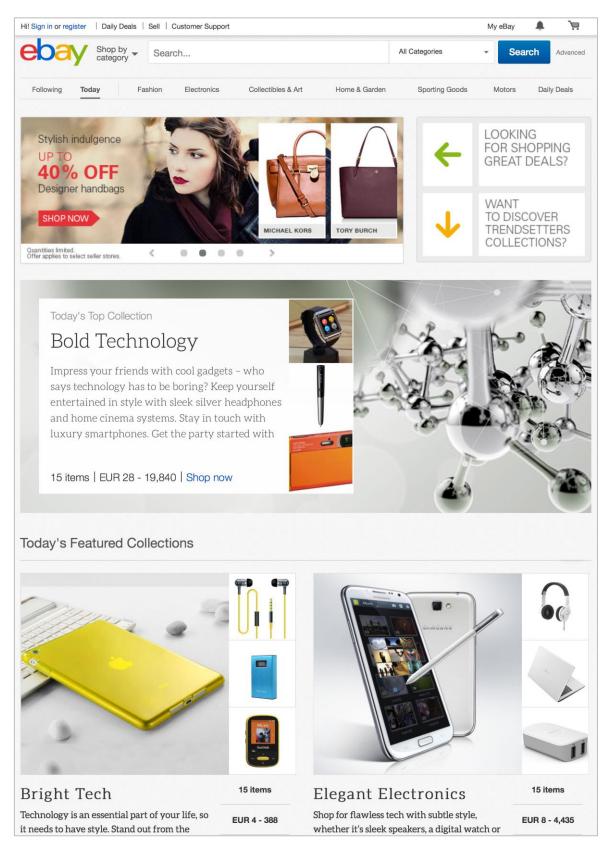


Samsung Galaxy Note III SM-N900V - 32GB - Black (Verizon) Mint Rooted As-Is

43 Bids **€237.48** 3h 53m + €20.89



Appendix 13. eBay tablet without search word



crowd with an iPhone in a bold shade, or a lemon yellow radio and matching MP3 player for your music library. Capture more with a 🗏

Shop now

a wireless storage device to free up space on your Apple Mac. Modern and minimalist, these electronics are designed to perfection.

Shop now



## iPhone Revolution

It's landed. Get your sleek new iPhone 6 and all the best accessories. Whether you're starting the party with bluetooth speakers, tracking your run, or picking a colorful case and stand, your phone can be totally tailore  $\ensuremath{\overline{\mathbb{F}}}$  15 items

EUR 5 - 855

Shop now



### Deco Time

Every DIY essential that you cherish takes pride of place in your humble cupboard. A cordless electric saw and long tape measure are central to your hobby. You'll be working this weekend, so don't forget your overalls.  $\equiv$  15 items

EUR 4 - 458

Shop now



### Rebel Rebel

Vivienne Westwood and Alexander McQueen are your heroes. You're crazy for leather jackets, vintage band tees, tartan and classic Doctor Martens. Your style is tough but your red electric guitar is tougher. Rebellious 15 items

EUR 2 - 7,128

Shop now



# Take a picture

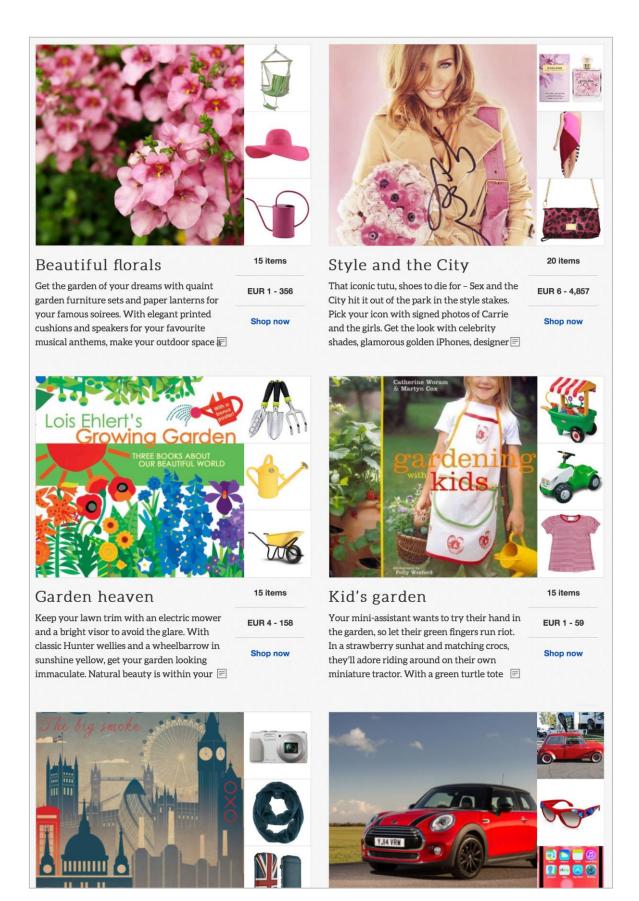
Photography is the perfect way to relive all those brilliant nights out with friends. Go retro and preserve your memories with Polaroids and print them out with the latest portable printer. Don't forget to show off your



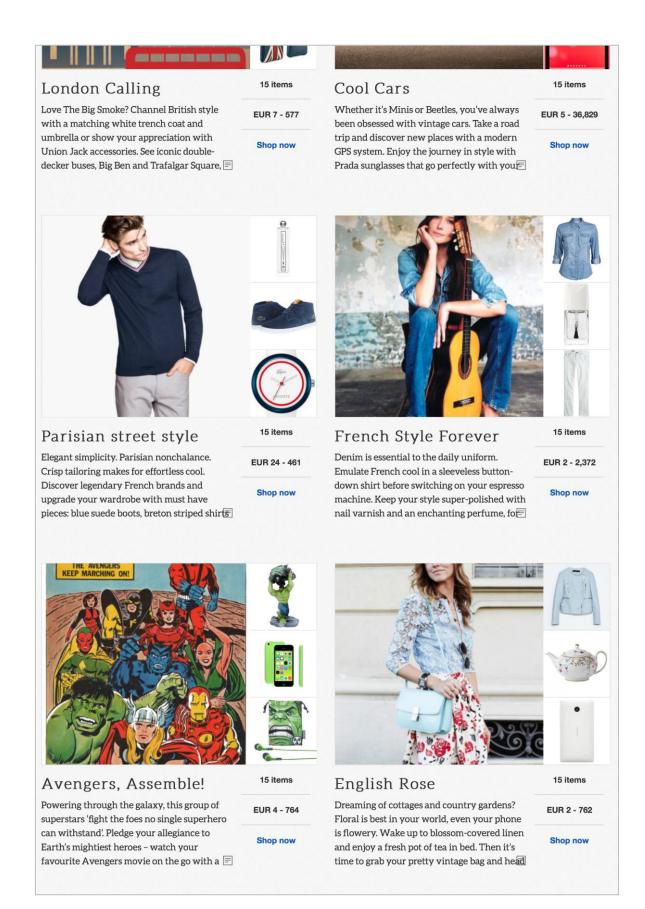
15 items

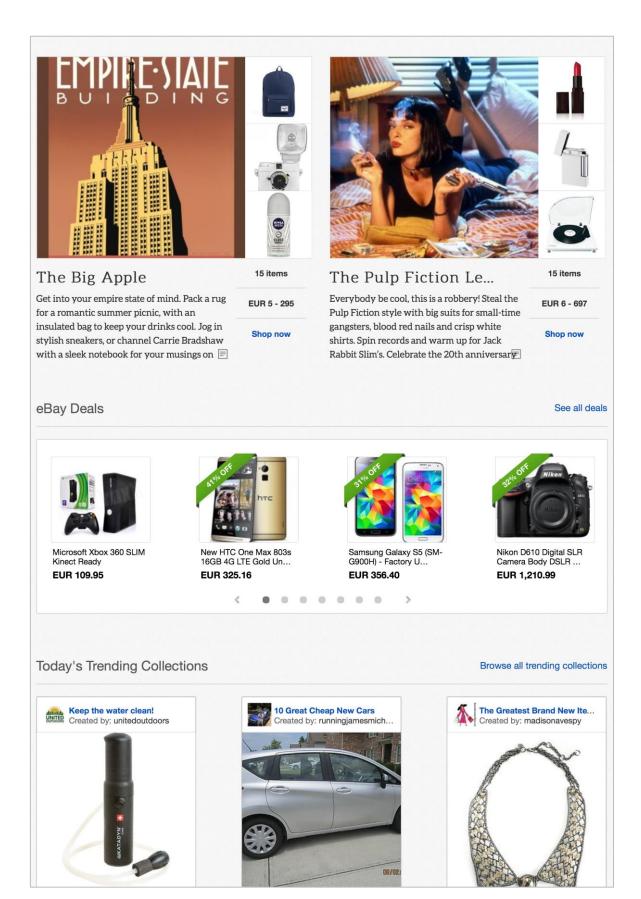
EUR 8 - 1,188

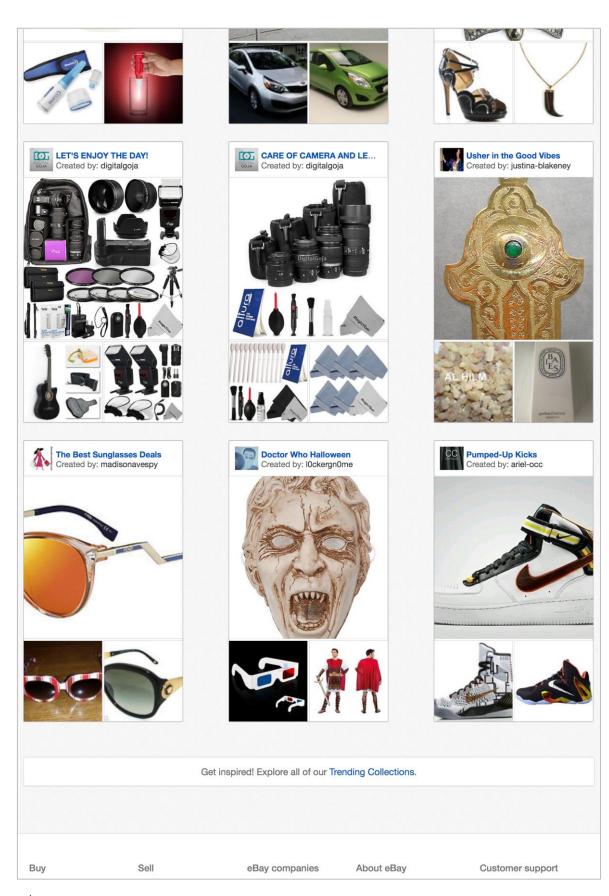
Shop now



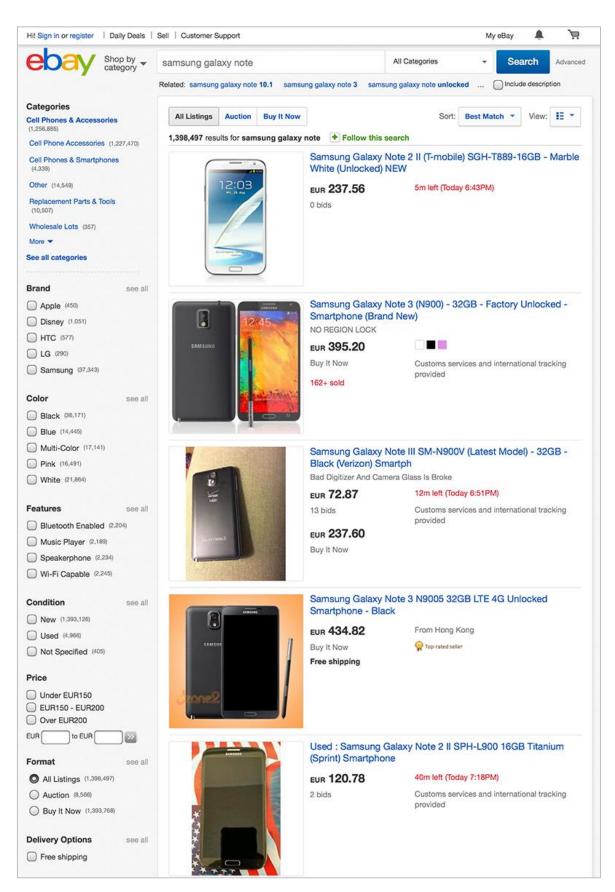
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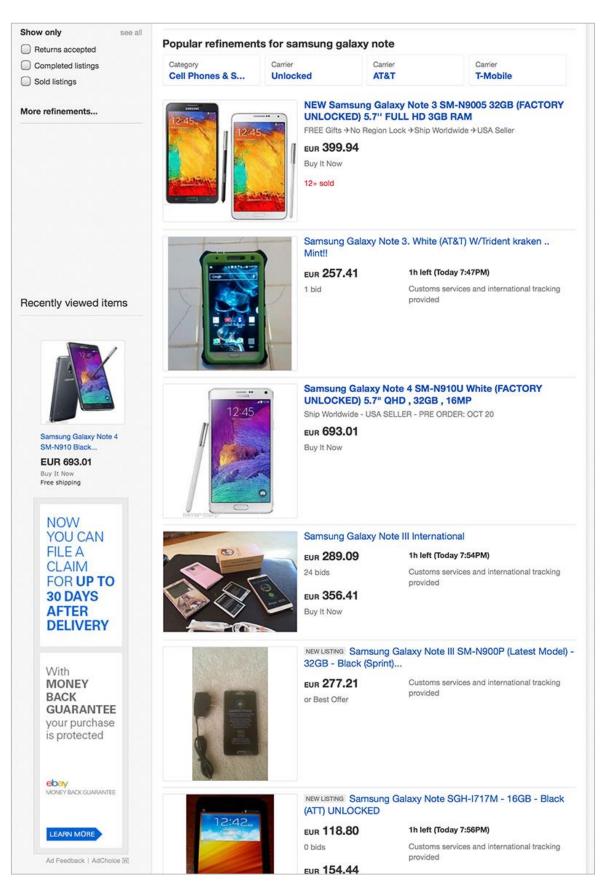




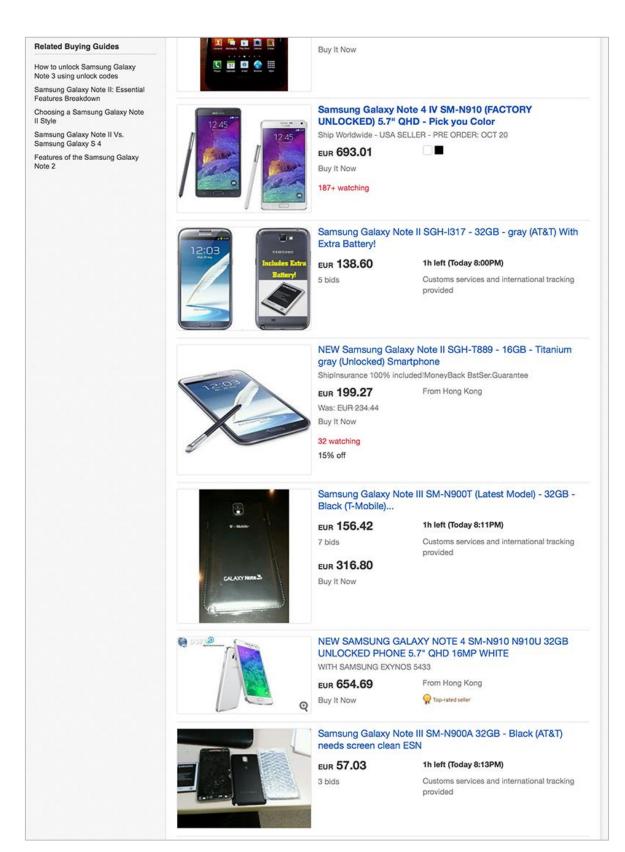


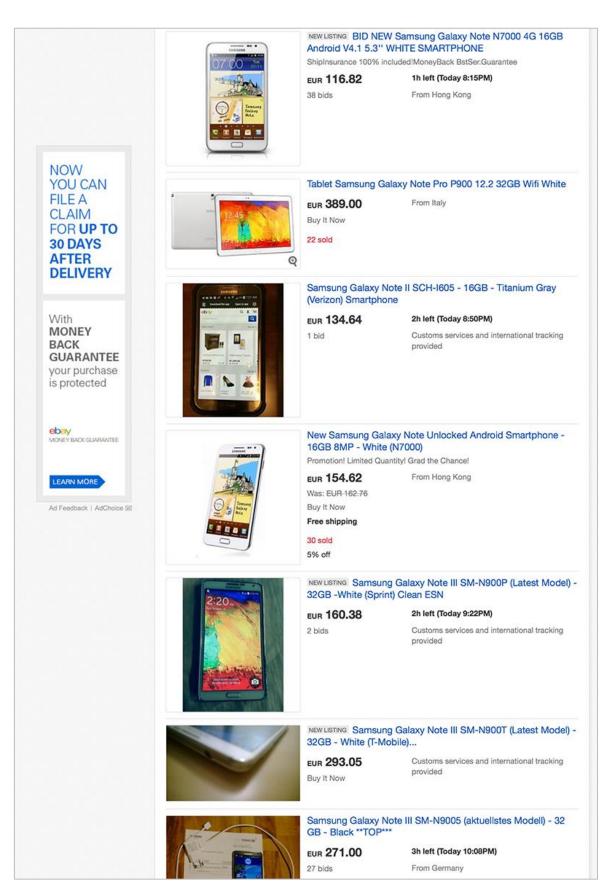
Registration Start selling eBay Classifieds Company info Resolution Center eBay Money Back Guarantee Learn to sell Shopping.com Investors Seller Information Center Half.com 2014 Annual Shareholders' Meeting Bidding & buying help Business sellers Contact us Community Top products StubHub eBay Inc blog Tools & apps Announcements Brands on eBay See all companies Government relations Mobile apps Answer center eBay Local Jobs Stay connected Downloads Discussion boards eBay guides Advertise with us Developers Preview new features Facebook Policies Gift center Security center eBay Giving Works Twitter Verified Rights Owner (VeRO) Program eBay Wish list eBay official time eBay Celebrity Google+ Tell us what you think Gift cards Site map Groups Gift guide eBay top shared Group gifts eBay Sites **ebay**" MONEY BACK GUARANTEE ^ Copyright © 1995-2014 eBay Inc. All Rights Reserved. User Agreement, Privacy and Cookies. How can we make this page better for you?





2/10









NEW LISTING Samsung Galaxy Note 2 W New Sim Card Just Received From Verizon Not Activated!!

EUR 197.96 or Best Offer

Customs services and international tracking provided



Samsung galaxy note 2

4h left (Today 10:42PM) EUR 30.10

Customs services and international tracking 6 bids provided



NEW LISTING Samsung Galaxy Note II GT-N7100 - 32GB -Titanium gray (Unlocked) Smartphone

EUR 197.21

Customs services and international tracking provided Buy It Now



Samsung Galaxy Note III SM-N900A unl0cked - 32GB - Black Smartphone - MINT

Mint Condition.. selling because I am getting Note 4

EUR 198.00 4h left (Today 10:48PM)

Customs services and international tracking 1 bid

provided



NEW LISTING Samsung Galaxy Note III SM-N900P (Latest Model) -

32GB - White (Sprint)...

Please read Carefully BAD ESN

EUR 198.00

Customs services and international tracking

Trending at EUR 316.81 provided

Buy It Now



Samsung Galaxy note III (3) Tmobile 32gb in Black - Bad ESN comes w/ box

EUR 180.18 4h left (Today 10:52PM)

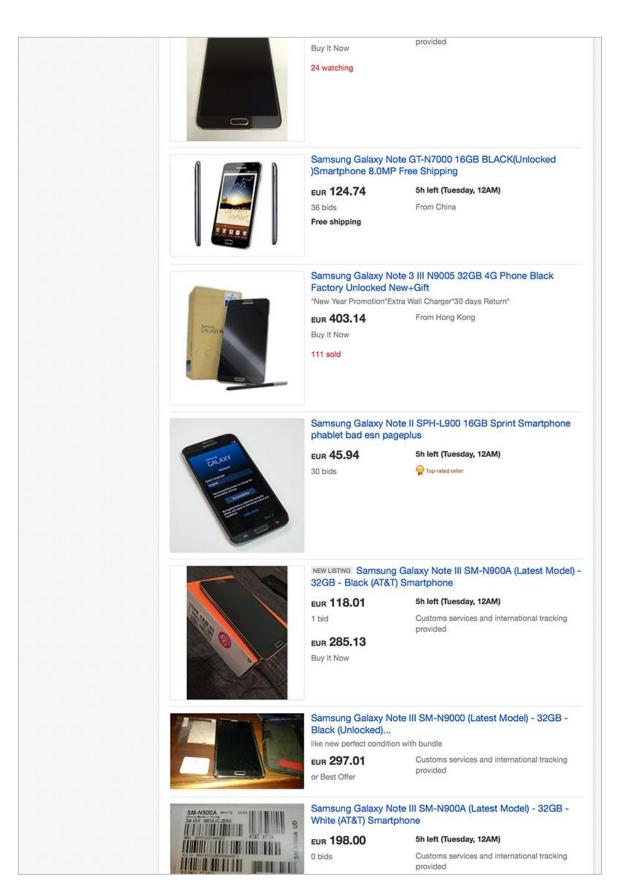
48 bids Customs services and international tracking

provided

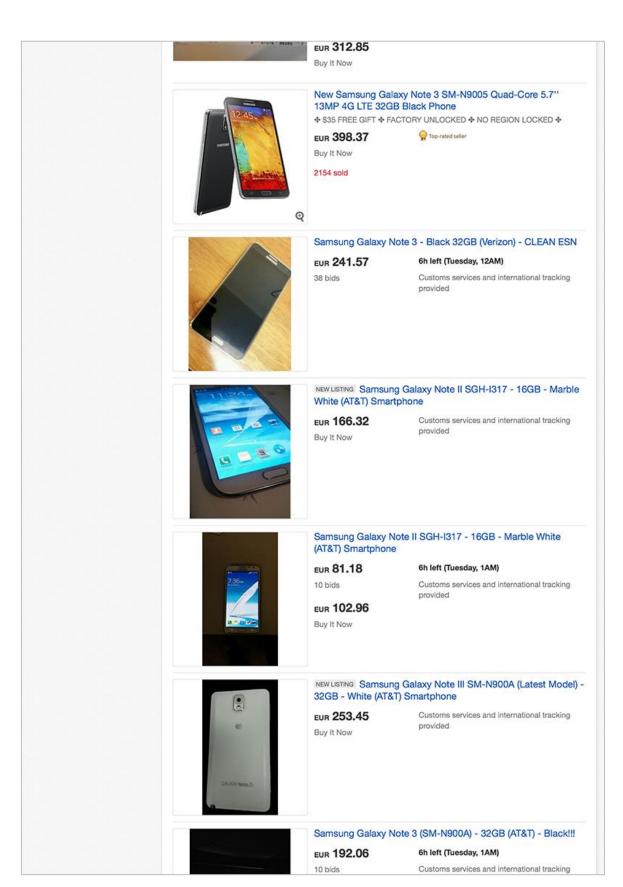


Samsung Galaxy Note 3 SM-N900T 32GB - Jet black Unlocked

Customs services and international tracking EUR 316.77



6/10



7/10



provided



#### NEW Samsung Galaxy Note LTE SGH I717 - 16GB White AT&T **UNLOCKED Smartphone**

EUR **237.60** 

Buy It Now

Customs services and international tracking provided

563 sold



#### Samsung Galaxy Note III SM-N9000 (Latest Model)-32GB -Black (Unlocked). EXTRAS!

Tons of Extras WITH Buy It Now! Excellent Condition.

EUR 271.66

6h left (Tuesday, 1AM)

4 bids

Customs services and international tracking

provided



# NEW Samsung Galaxy Note N7000 4G 16GB Android V4.1 8MP 5.3" WHITE SMARTPHONE

Buy It Now

34 watching

15% off





#### Samsung Galaxy Note III SM-N900A (Latest Model) - 32GB -Black (AT&T) Smartphone

EUR 47.52

6h left (Tuesday, 1AM)

11 bids

Customs services and international tracking

provided



## NEW LISTING Brand New in Box Black Samsung Galaxy Note 3 SM-N900V 32GB Verizon Clean ESN \*

EUR 372.24

Buy It Now

Customs services and international tracking

provided



Samsung Galaxy Note II SCH-R950 - 16GB - Gray (U.S. Cellular) Wont Read Sims

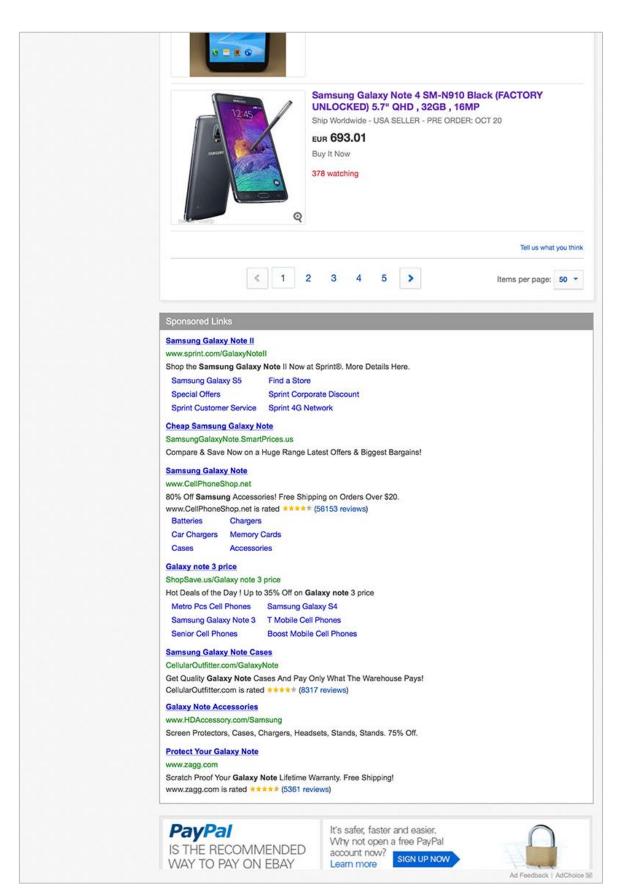
EUR 36.43

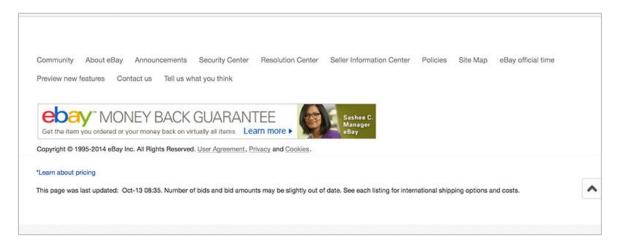
9 bids

6h left (Tuesday, 1AM)

Customs services and international tracking

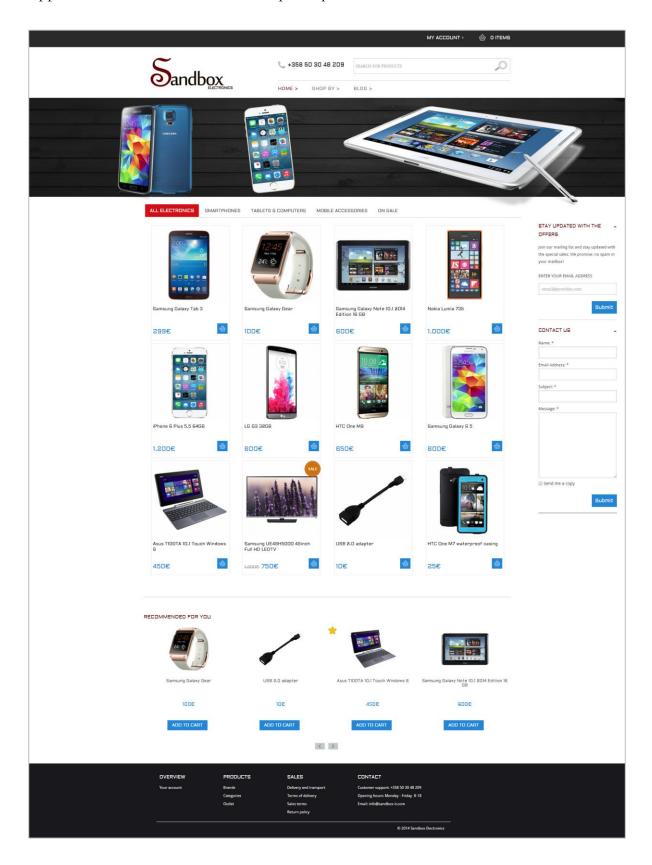
provided



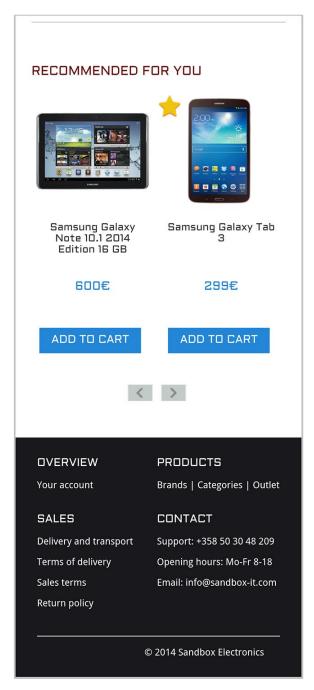


10/10

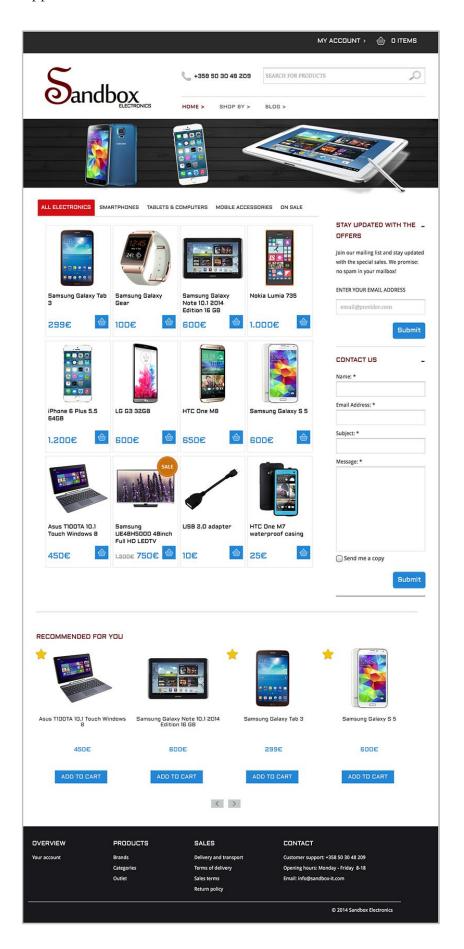
Appendix 15. Test website for desktop computers



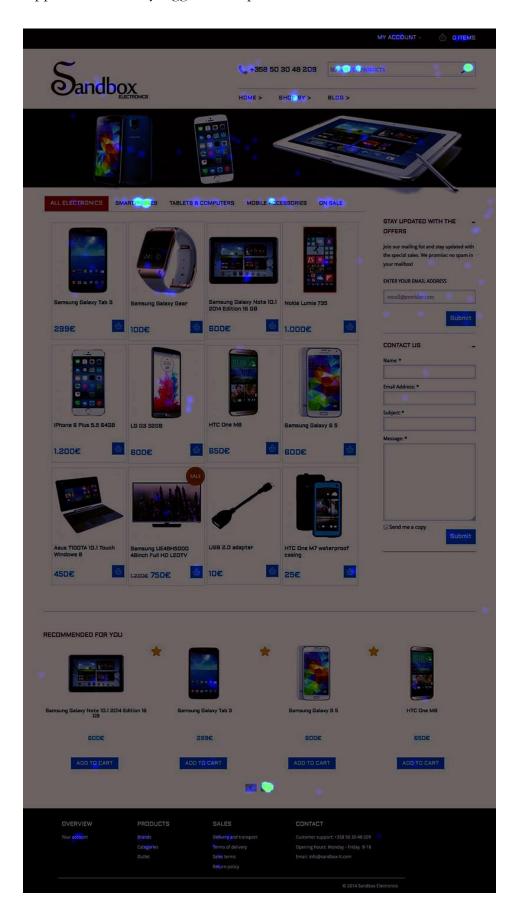




Appendix 17. Test website for tablets



Appendix 18. Crazy Egg click map



Appendix 19. Crazy Egg scrolling map



Age:

## Gender:

Country of origin:

# IT background:

Highest level of education:

	. •	
-010010	l questions:	
UCIICIA	i duestions.	

- 1 Do you use Google's search engine?
- 2 What do you like most about Google's search engine?
- 3 Would you like to improve something about that search engine?
- 4 Do you think Google's search bar is wide enough?
- Do you usually scroll down until the bottom when searching or do you only use the highest search results?
- **6** Do you shop online?
- 7 If yes how frequently do you shop online compared to shopping in physical stores?
- 8 What do you like most about their homepage layout?
- 9 How easy is it to use an e-commerce website on a scale from 1 to 10?
- 10 Do you think an e-commerce website can be too long?
- 11 Do you usually scroll until the bottom of an e-commerce website?
- 12 Do you have any suggestions of improvement?
- 13 How many different e-commerce web shops do you use and which ones?
- 14 How do you feel about the advertisements displayed in an e-commerce web store?
- How do you feel about overcrowded e-commerce shops, do you think "the more the better"?
- 16 Do you think your favourite online store has a big enough search bar?
- What is the place on an e-commerce homepage you would expect to find the shopping cart?
- 18 Which colours do you like most in a website?
- 19 Do you think a website should have many different colours?
- 20 How do you feel about slow webpages, would you use them anyway or would you avoid

them? Desktop computer: 21 Is there something about the test website that annoys you? 22 If yes, what and rate it on a scale from 1 to 10? 23 Do you have suggestions of improvement for this test e-commerce site? 24 Would you consider shopping at this e-commerce shop once the page is ready? 25 Do you have any further comments? 26 Do you use your phone to search on Google's search engine? 27 Would you like to suggest some improvements concerning mobile browsing? 28 Do you use your phone to shop online?

Is too much scrolling a problem when browsing on mobile?

Do you use Google search more often on browser or its app?

29

**30**