Usability

- A Case Study of Active X

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The goal for this thesis is to gather information regarding Active X program. The information will be put in use and will be taken to usability testing. This thesis is written to enlighten readers of a problem and the state it is, offer solution and process the results.

The current information available for the subject is mainly written in Korea, so it needs to be translated and made into readable form. English is better in doing so, as it shares main writing terms with the Korean language, rather than Finnish language. The project will be written for a certain company residing in South-Korea, which will then use it at their own will for future business activities.

Mainly the information gathered is from official Korean government texts, and thus the information should be related and trustworthy. They are aware of the problem, the fact that it exists, and they have made some work trying to fix it. But all this is not enough yet, as they are unable to see the full problem and understand the cause from common folk point of view and from the experiences of everyday use. Common usability testing should help here, to see how the program reacts to normal use.
Testing the program in common transactions and basic information gathering from a school site provides the needed knowledge of how the program performs in tasks that should be doable by any common worker or student that currently reside in Korea.

Methods such as interviewing and benchmarking are to be used to gain insight and possible solutions to the problems mentioned. Interviews will be fully done in the South-Korea, Seoul region. Interviewees will be locals and foreign students or workers who are living in Korea. By this information we can learn the user experience from common folk without biased opinions. Benchmarking will happen by comparing other similar programs that are used in other countries, and to possibly see other solutions that could be used. Usability testing will be used to find out how's the service doing in every day environment and shows the problems there might be of. Tests will be performed in different environments.

Keywords: Motivation, Purpose, Methods

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1   Introduction

By year 2018 there is 51,119 million people living in South-Korea. 10,19 million of those people are living in the capital, Seoul. Seoul is also the destination for many foreign students, workers or people who have moved to Korea from their home countries.

It's a popular exchange study destination, while it can be challenging language wise, there's also many other things to take into consideration. One of the things are the system attached to payments made known as Active X. This is the system used for every transaction that happens inside Korea, with Korean credit card or Korean bank. For many foreigners this can provide a great deal of challenge as for the verifications alone, you need to install multiple application only provided in Korean language. Not to mention the localization obstacles you will face as you try to install them as you might not have Korean language pack in your computer, in which case everything will be presented in question marks. After getting everything installed and applied to your computer, mobile phone or a tablet, next step is to make a verification with a working South-Korea mobile number. This number needs to be monthly contract, and prepaid cards are not valid. If you want to get this monthly contract, you will require alien registration card, South-Korean visa or permit and a stable accommodation in South-Korea. Even then the price of this contract is somewhere between 60 to 150 euros a month and requires you to sign up for at least two years.

Using this kind of system does not only limit to payment verifications, you need to get public bikes, use library, verifications for online games, verifications for online shopping sites and anything else related to identifying yourself. The bikes require a Korean travel card which needs to be verified through Active X, this is to be tested as part of usability research. Most of the Korean hotel application also require users to have an actual Korean Mobile contract to be able to register for their provided services, getting the best deals is usually through Korean Hotel applications. Connecting to some Wi-fi's also requires the use of phone confirmation, this verification travels though the Active X's verification check which then sends the activation code to one's phone number.

Foreigners in Korea might have some problems with the verification steps, but also many locals seem to be frustrated by the number of steps and unnecessary complications these verifications bring to their everyday life. There is a writing assignment from South-Korean student who wrote little bit about Active X for her English class. Here.

As Active X is only runnable with Internet Explorer, there could be some security weak points. This forces most of the Korean programs to be run with Internet Explorer in which they will sometimes have problems with. Some possible problems to keep in mind when making big

transactions include; freezing, which makes the transaction sometimes fail, and in the worst case get accepted, without the actual payment going through properly. This could mean that you pay for something and the money leaves your bank account, but it doesn't register so you will not get your product or service.

Some security measures used by Active X could use little bit of improvement. As customers get used to download additional programs during the installation to their personal computers every time, they habitually started downloading without thinking or checking the content they are downloading. And this opened a gateway for hackers to use fake Active X and plant malware on people's computers. This leading important data or information to be leaked to hacker's hands. By infiltrating different computers, hackers were able to leave these attacked computers as host computers for sharing more malware in the form of spam emails or programs as an example. These problems lead the developer of Active X to recommend using Active X in the future for online certifications. From windows 8 onwards, Microsoft is no longer supporting the usage of Active X. One more thing about Active X's usage, is that it disables some security measures while performing its actions. This might leave the computer vulnerable to attacks for a short while after the transaction is performed, or in the worse matter while the action is ongoing.

2   Active X, a questionable plug-in

Figuring the purpose of Active X and the means that make it work.

Active X is a program operating inside computer after being installed. The installation is a complicated process as it requires you to install multiple so called junkware or trash ware for the actual program to work, these programs need to be installed to make Active X working and performing its actions. It interacts with such programs as Microsoft, Windows and Internet Explorer. It opens the possibility to perform certain functions within themselves, such as displaying videos, games or run programs. These plug-ins also allow the addition of features to a program that were not present in the original installation and allows the modification of certain files. To have everything installed, you need to have internet connection and for the plug-in to work properly and perform certain certification, internet connection needs to be established.

Figure 1: Active X Pop-up (Kim Hwe Su, 2017)

Programs that operate Windows operating system can use Active X plug-ins and controls. Some of these are Microsoft Office and Windows Media Player. Active X able these programs to share information with web and other programs within the same computer.

One note is that only Windows operating system computers can run Active X. Downside of this is, if anything is running in system other than Windows operating system, or Internet Explorer, it displays improperly or includes errors. Even though third-party plug-ins are being released to enable the plug-in to run, it's still causing problems. The fact that these programs are getting released and made, clearly shows that there is demand for something better. Obviously, these third-party plug-ins could have anything within them.
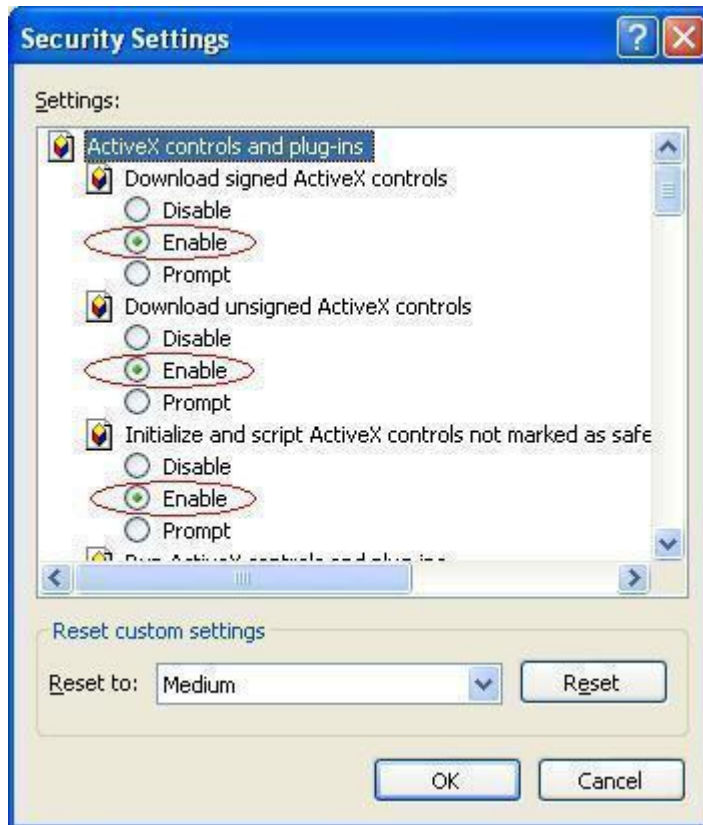
Figure 2: Active X Security Settings (Tech-Faq, 2015)

As Active X plug-ins have full administrative access to everything in the Windows operating system, this could potentially lead to some unwanted programs lurking into once computer without questioning where they came from. The reasons are that browsers which support the plug-in can be cheated into turning off security factors and gaining access.

The downside for that Active X can only be used on Internet Explorer is that most people using internet with Mozilla Firefox or Chrome, are unable to access this plug-in completely. However Korean government insisted on using authentication way of using Active X. The result is that Koreans were forced to use the inferior Internet Explorer, which means other web browsers cannot survive in Korea apart from Internet Explorer.

2.1   Timeline

Security problem in certificate was issued in 2010, National Korean finance supervisory service (FSS) made verification method assessment council (VMAC) for finding replacement verification method.

Figure 3: Active X Certificate (Kang Il-Yong, 2015)

20/12/2012 Online finance fraud prevention (OFFP) service was established for few people who wanted to apply for it.14/05/2013 FSS announced that OFFP will be expanded for everyone from September 26. OFFP is a service that provides extra security verification when using internet banking or issuing certificates. This service was established, because Financial district noticed that there were issues and holes in the current state of certification.

Year 2013 February professional hackers were able to steal about 700 certificates that were issued by major Korean banks. In May a few hundred of certificates were leaked to hackers in pharming methods.

IT-security business assumed that there could be tens of thousands of certificates that were leaked into hacker's hands.

2013 March Hackers attacked broadcasters and Financial agencies, and they used falsified authentication management program XecureWebControl and spread the fake program country-wide. After this incident, the hacking method was revealed so that raised awareness about Active X's real security and the lack there of. There's a lot of people concerned and arguing that Active X should be rapidly discarded. For example, the leader of Dreamwizz said that forcing people to use Active X is like army protocol and people should have freedom of choice in this regard.

2013 April, there were discussions about getting rid of Active X and replacing it with HTML5 replicate. But this was soon to be discovered a huge project as Active X is so highly influential in the authentication methods currently in use and will not be implemented in a short time.

Still in 2016 as people are seemingly displeased about the failed attempts to do online purchases due to failed authentication attempts. According to Jeonghyun Known, her banks security apps slow her computer to a crawl, so she is forced to uninstall all the applications required to use the Active X components after the transaction is done. This often leads to need for a better solution. She believes anyone who has tried to make online purchases in South-Korea will know her pain and is not happy by the fact that Korea's 9.8-Billion-dollar ecommerce industry has reached this level, even with the highest internet speeds in the world. People accessing any online shopping sites with desktop or laptop are also restricted to the use of Internet Explorer. The restriction of Internet Explorer usage seems to be in Korea, Japan and Greenland an existing problem still.
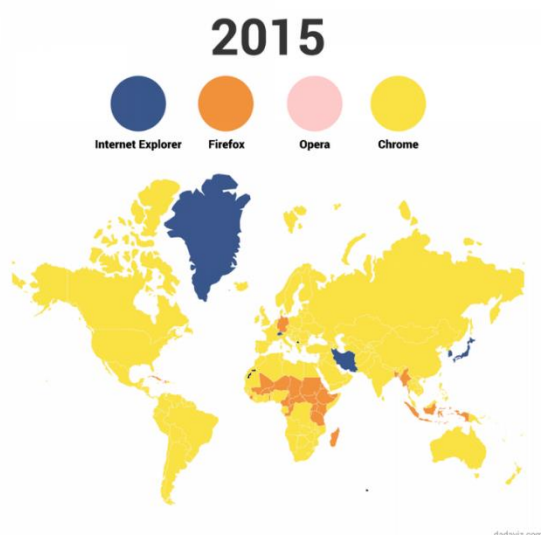

Figure 4: Usage of Internet Explorer (McAlone, 2015)

Currently as of 2018 there is a form going on to remove Active X and it is getting thousands of daily signatures from people who want to see it gone. The website is called http://noactivex.net

Figure 5: No Active X (Bin Kum, 2014)

2018 The newly elected South-Korea president Moon Jae-In started a pledge to get rid of Active X already during his elections even before being chosen for the president of South-Korea. After the election as the president, the pledge started going forward rapidly and now is an ongoing process to get rid of Active X plug-ins and related public Government websites by the year 2020. New rules should include that new websites that are being created will not use plug-ins. Digital signature regulations are also being promised to be changed in a way that accessing an online certificate would not require external plug-ins.

Figure 6: Stop Active X (Kim Eun Bin, 2018)

The poster above is campaign poster towards crushing Active X and the plug-ins that come with it. The top right stamp is the official government signature, which means the process the get the job going is highly on its way.

Before this takes fully effect, for companies it would be good idea to find alternative payments methods to use for everyday transactions. Such as those currently used abroad and have been working to this day.

2.1.1 Online certificate

Active X is related to certification so heavily, so it is necessary to make the meaning of that clear.

Getting the online verifications from banks, is in real world term same as getting your important papers stamped physically. So, this certification is supposed to replicate it in the online transactions, where physical contact is not possible or necessary.

Using this online verification method, opens the possibility of getting into the verified data in the middle of the actions. There is a possibility for hackers as an example, to gain access of the valuable data being transferred.

90% of people in the Financial Korea are using this verification method, by the year 2013; 30 million certificates were issued. By all this, we can see the service is heavily used.

Some problems in the past with the online certificate. A couple wrote a story about their struggle with the online certificate associated with Active X.

A Korean couple married for one year tried to get a special house for newly married couples. This is basically a house offered by Korea government to help newly married couples (Korea land & housing corporation). The couple visited the website to apply for the house. They had to spend plenty of time installing applications that come with Active X, this was done during lunchbreak, so they had to skip eating to get this done. Without eating they somehow managed to login after installing the programs. Next problem however was that they were missing a marriage relationship official paper that they needed for applying. To get the paper, they had to enter official court website where they then proceeded to apply for the paper, but it was behind another application wall. For the paper they had to download six different files including certificate and electric module. All this hassle cost them all the breaktime they had and still late from work. This experience here is grand example how Active X can make the simplest thing feel like a chore.

2.1.2 Humour included

There's even multiple comics about Active X, because people of Korea are so frustrated about using the plug-in. There's a popular web comic going on in Korea like Finland's Fingerpori and It's often discussing the issues of Active X in a multiple humorous way.

Figure 7: Comic1 (lee, 2018)

Figure 8: Comic2 (Lee, 2018)

2.2   Popularity

Active X is highly used in Korea because of few reasons. The main reason why Koreans are currently so used to downloading this plug-in to PC is heavily related to certificate. In year 1999 National Assembly decided the current online signature rules for Koreans. After this event they assigned six institutional organizations to handle future online signatures. And the certificate is a technology based on Active X. This caused people to have to use Active X for signing anything.

Second reason is that developing Active X is easy and painless procedure. You can adjust the plug-in itself directly from your browser. According to Korea Internet & Security Agency (KISA) at least 80% of major websites used in Korea are mainly using Active X for certification and online signatures. In developed countries; one out of 20 are using Active X as well. Because of this customer who are using internet banking or online payment need to press Active X control download many times to get everything downloaded. For financial transaction you will need a certificate, for this certificate you are required to install Active X and the following plug-ins as people are so used to accepting these downloads and terms, the usage is easily manipulated to make people accept anything as long as it comes as a pop-up during downloading the plug-in.
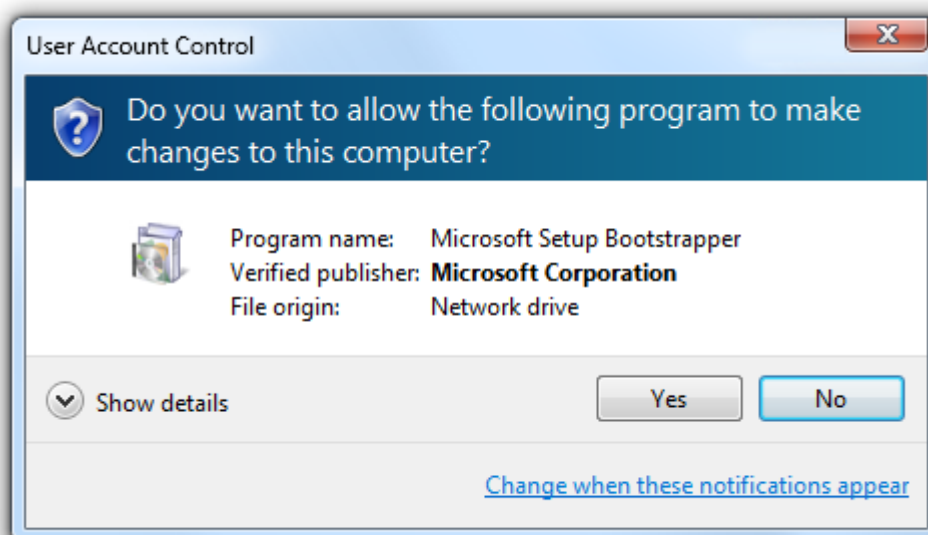
Figure 9: User Account Control (Microsoft, 2018)

There are currently millions of exited students to get into universities for their first semester. Korea has more than 400 Universities, more than 80% of young adults go to these universities. In South-Korea getting into these schools is one of the most important things in life. Applying for these schools require you to check-in through online verification. Unfortunately, every single school system requires different security plug-ins all attached to Active X; this means these students are forced to browse all these websites with Internet Explorer and install tens, if not hundred different plug-ins that serve no other purpose than confirm that single login.

In 2015 the U.S. ranked 10th among OECD countries in college attainment

% of 25- to 34-year-olds completing at least an associate degree

OECD average, 42%

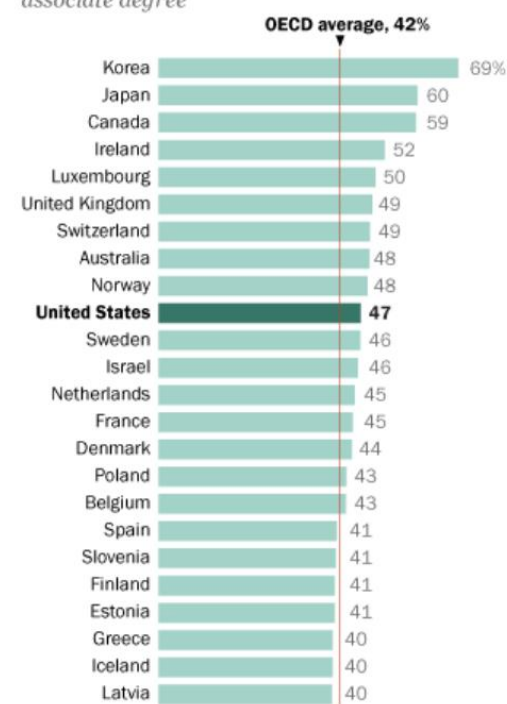| Country	%
Korea	69%
Japan	60
Canada	59
Ireland	52
Luxembourg	50
United Kingdom	49
Switzerland	49
Australia	48
Norway	48
United States	**47**
Sweden	46
Israel	46
Netherlands	45
France	45
Denmark	44
Poland	43
Belgium	43
Spain	41
Slovenia	41
Finland	41
Estonia	41
Greece	40
Iceland	40
Latvia	40

Figure 10: OECD (Cohn, 2017)

In South-Korea other browsers did no exist couple of years ago at all, because people were simply not aware of the existence of other web browser possibilities. Even recent years, in middle or high-school Internet Explorer is introduces as The Internet, all the way from early years students think it is the only way to access internet. Same goes for older people who are recently started to learn internet usage. Internet Explorer is so used in Korea, people keep

thinking it's everything there is. If you would show these people the image of Internet Explorer, they would think it equals the actual internet, instead of the web browser that is one of many. They didn't think about using other browsers at all because of this, so when they were coding anything, they did not follow web standard, so most of the older websites are not working properly if not accessed with Internet Explorer. There is a website for gaming that is popular in Korea, and the you are unable to access the site at all if using any other web browsers, this because they blocked anything else.

Figure 11: Explorer (Anonymous, 2017)

Government should've intervened here, but instead they kept using it themselves and they ignored the fact that the web standards would've been followed. This lead to a case where people entered their social security numbers on a website, and their numbers were visible to anyone across the world who entered the site with other web browsers. Social security numbers that were encrypted in Internet Explorer, were completely visible if opened in source code of any other browser.

 This shows what happens when security standards for websites are not followed but ignored.

There are multiple cases of exposing personal information that has been stored in the site database, due to lack of compatibility test with other browsers. These lead to massive information losses and possibly exploitation of them. There has been over 200 cases of information leakage or loss in important websites such as school, forums, private education and such.

With the latest browser from Microsoft; Microsoft Edge the use of Active X has been completely disabled. According to Cybersecurity expert Aviram Jenik, disabling the usage of Active X from Edge was Microsoft's proudest achievement in the recent history.

3   Interviews

In this section I will put a collection of interviews I did in South-Korea, Seoul. I was interviewing students and working people of different ages and nationalities. More interviews were done later through email interaction to gain more knowledge about the subject at hand and looking into the problem in a more objective manner.

Together with interviewees the goal was to figure how using the plug-in works in real world, and tests were made accordingly.

Seemingly the first problem that was encountered was the language options or the lack there of. The only available language to use the plug-ins was Korean. 3 out of the 5 testers were not able to understand what was going on. Using the transaction required three different plug-ins. Language barrier seems to be the problems for the non-native Koreans, which seems to make the usage of the program harder than it should be. If there was an at least English language option, person downloading would be able to understand purpose of the download instead of blindly proceeding by pressing enter.

2 out of the 5 testers also had problems then installing the actual files, as the download process seemed to be stuck. This was fixed by changing web browser to Internet Explorer, which then led to completed download processes. This was not familiar procedure for all the testers, which caused confusion. The optimization of Active X does not allow any other browser to be used outside said Internet Explorer, so trying to access it results in either error, blank screen, computer getting stuck or in the worst-case crash. This could potentially put the program in the unusable scale in Usability research measurements.

4 out of the 5 testers were not of Korean nationality, so the absence of mobile contract was present. The confirmation process of the program required either a solid local phone contract or USB-stick provided by Bank. This USB-stick can be obtained through Korean bank, after making a local bank account. The USB-stick contains information about the person whose bank account was created.

As the results; 3 of the 5 testers managed to go through the full process of applying for verification and payment, by using Active X components and plug-ins. The ones who were able to do this, had either phone contract or bank account. There doesn't seem to be a way around this, thus making another option for payments necessary.

Positive results were gathered together.

Most testers learned something new about the program and learned to use it in the end, even though full payments did not work due the lack of phone number and/or bank account, greater understanding of the program and how it works was gained. The program did not crash any computer during the tests, and only freezing and minor jitter was noted. Any safety threats were not encountered during the tests and apart from not understanding part of the downloaded plug-ins and the reasoning for doing so before explanation, all felt safe attempting the transaction.

Negative results were grouped together and processed.

The program was not cooperative in terms of language and for majority of the users this was the first problem they encountered. Other noted issues were the freezing of computer after installation of the plug-ins and unpleasant thoughts towards installing programs which origin was unclear. Also, should be noted that the program was not allowed to be installed on apple products, such as iMac or iPad. Thus, making these expensive pieces of technology not optimal for this test. Some users felt frustrated being required to change to Internet Explorer for a simple transaction, which could be potentially more unpleasant if the browser did not exist on the user's computer at all.

Possible improvements were searched based on the results given.

Discussion about the improvement mainly focused on three things; language, compatibility and plug-in removal. If there happened to be a reason to build the program again from scratch and making it work again, instead of replacing it with a different method. The first obvious choice would be to make it available in multiple different languages and let there be a choice where user could select chosen language. Making it run in different languages would be easiest of the fixes but would make the program so much more user-friendly.

Another improvement could be standardising the plug-ins that are required for the program to run and making the select few that will work for all the transactions, thus making the requirement for installing multiple ones obsolete. Creating one standardised plug-in attached to the Active X program, could potentially win some people over, comparing it to the current situation of installing five different ones with every single transaction. The testers thought that saving the hazzle of multi app installation could ease the pain that is making the transaction.

There was also discussion about the necessity of all the external apps, and why they are needed. Bank application in other countries only use a single working plug-ins, and seems to

be working without errors. As in many cases in the past, copying something that works could be also the answer here.

4   Benchmarking

Chrome web browser is currently using a plug-in called Silverlight, which functions are like those of Active X's. And as this plug-in is mainly made for Chrome, it's usually the more popular Web browser than Internet Explorer, at least outside Korea, this is most likely the reason not many people have heard of the Active X outside Korea.

Figure 12: Silverlight (Dean, 2014)

Silverlight is developed by Microsoft and is being presented as a Microsoft's LIVE service for developers. It offers many choices in terms of customization, but unlike its Internet Explorer cousin, it does not have nearly as many restrictions and problems.

Silverlight's applications are delivered to a browser as text-based language XAML. It enabled google to scan this XAML and makes the usage more fluent for google users. Working well with google also enables its applications to be well findable in the search engine.

In South-Korea google is rarely used for anything, instead there is a search engine called Naver. For People in Europe, Google is technically the leading search engine for majority of the people, but for some Korean, they have never heard of Google.

As of 2017 Naver handled 74,7% of web searches in South-Korea. More than 25 million Koreans have Naver as the start page of their default browser and the mobile application has 28 million visitors every single day. Hence, it's referred as the Google of South-Korea.

As regular computer used uses Silverlight in their daily web browsing, they will not even notice the existence of this plug-in. Compared to Active X it rarely asks for confirmations or communication with mobile number.

For developers, Silverlight is easily modified with dynamic programming languages such as; Python and Ruby. The plug-in is mainly made for developers than your everyday user but makes it, so you will not be bothered by it if you don't acknowledge it.

Silverlight at its current state supports Full HD videos and is planned to support Ultra HD in the future as well. Its applications are delivered to a browser vial XAML which makes it easier for Googles search engine to scan these XAML files. Thus, making it a superb option for the users of Google Chrome. Sometimes flash heavy sites have tendency of putting their applications in a web code, that might make search engines to have capability to find these sites impossible. Silverlight can make these sites more findable. Not only is Silverlight solid technology, but also keeps getting support from Microsoft constantly.

 Testing Chrome and Silverlight together for making a bank transfer from Finnish bank to Korean bank. The amount chosen was equivalent of 1,000,000 Won in Euros, which is 765 Euros.

Bank setting needs to be set, so the amount of 765 Euros is within the transfer limits of the bank. Accessing the bank with Chrome's secured web browser and initiating the bank numbers to access the account. Limit being easily settable to 1000 Euros with a single person verification with a bank number verification card.

Setting a foreign bank transfer with the amount of 765 Euros, which will then be exchanged into 1,000,000 Won. The charge for the transfer being 5 Euros and being the only cost in this transaction test.

Within 3 weekdays the amount of 1,000,000 Won was transferred abroad from Finnish bank to Korean bank, using Chrome and Silverlight.

This could potentially be used for Korean company abroad for making foreign transactions and spreading their sales worldwide.

5   Solutions

The problem of insecure and expensive foreign transactions seems to only exist in South-Korea, an attempt to use different method for transactions could be the answer. Getting rid of the requirement to use Internet Explorer would be the first step. Forcing Koreans to use that internet browser is not beneficial to anyone and they could start using the more used browsers. This would not even affect the use of Naver, which works completely fine on any other browser than Explorer as well, it's only the Active X that requires Internet Explorer.

Second part should be getting rid of the forced and unnecessary online certificate, which requires anyone to install multiple outdated programs to proof that they are who they're supposed to be. Using simple bank account verification instead, like everywhere in Europe could prove efficient and effectively if tested abroad. This method is simple, effective and risk free. Only thing that is required is for people to keep their "number pads" with them, and not showing them around. If no one except you know your personal number keypad, there's no way accessing your account. Even in the case of someone managing to access your personal bank account, you get immediately notification about suspectful activity.
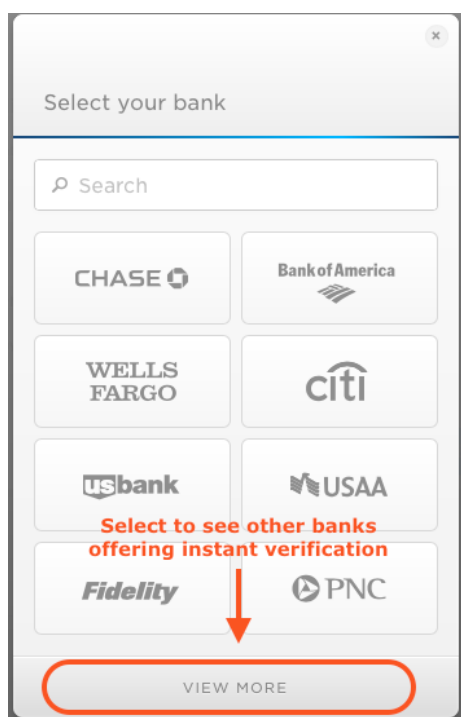

Figure 13: Bank Selection (Cameron, 2017)

Option for secure and smooth bank actions required for abroad payments for companies could be using an over the seas bank, while using service such as VPN (Virtual Private Network). Using this method would mean that the current problems that may be caused by the Korean banking system would be beaten by the usage of non-Korean bank. While using VPN, it shows your location elsewhere using a secure private network server, and your actual information is safe while being able to access abroad bank. By using banks provided outside Korea, using other web browsers could also be an option, since Active X controls would no longer be needed or required.
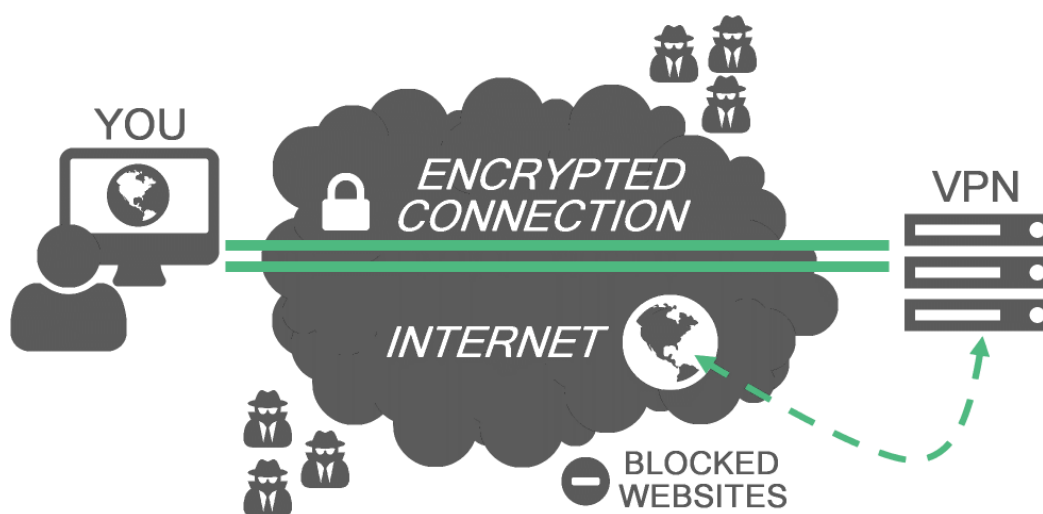

Figure 14: VPN (Bradley, 2018)

The wide variety of VPN's range from Free to hundreds of euros a month, but there is a high possibility that there is one for every user. If paying a solid monthly fee for fluent, secure and fast banking possibility isn't too much, this could be a solid option.

VPN has already gained a lot of fame in the use of US and Europe, but the fame has not found its way all the way to Korea just yet. By spreading knowledge about this service and all its possibilities, could be a way to make easier and hassle-free transactions for companies and organizations over the seas.

While Korean government is working on the replacement of Active X, they've been working on it for years so far, and getting the actual progress might take many more, using the VPN route could be the fix required while waiting for the change the government needs to make.

6   Usability Research

In a test person tried the parts of using a typical verification from a simple transaction from Korea to Finland. The transferable amount of 1 Million South-Korean Won, which equals to roughly 765 euros was chosen as a test sum.

Korean bank account was chosen, that had the 1 million Won for transfer. After this an amount of 1,000,000 Won was set-up for transfer to Finnish bank account. Due to regulations to this, only 300,000 Won was able to be sent. If this wished to be changed, you'd have to download multiple applications, heavily related to Active X just to access the site that the change is made from. Installing these applications proved to be tricky as the download would stop at 98%, without specific reason. After fifth attempt all the application were installed, and the page was able to be accessed the problems with installing seemed to be that installer got stuck over and over. This flaw was pointed out and appears to be a recurring problem while using the program.

From the website where the amount that the bank is willing to transfer at once had been opened. The option to make any changes was still invalid, as solid documentation was to be sent to the bank through online verification, so the amount was to be modified. This led to the fact that 300,000 Won was the maximum amount to be sent at once.

As the transaction started, and the money was ready to be sent, four other programs were to be installed for the verification of the money transfer. Last of these programs refused to in-stall again and had to be installed three times.

As the programs were all installed and the availability of sending money opened, only the 300,000 Won was able to be transferred. Everyone of these transfers costs approximately five euros each time as transfer fees plus the necessity to go with the banks current exchange rates which result in loss of around two euros extra.

So, in total to send the wanted amount of money; 1,000,000 Won, person had to go through the same thing three times and were still only to send the amount of 900,000 Won. And all this resulted in the payments of approximately 20 euros and 10 additional programs that were installed during the transfer process.

The transactions happened safely, and the money arrived within few working days each time.

Another test was performed where a certain item was ordered from the online store abroad. First, the page to make the order was chosen, it was iHerb. iHerb is a popular online store that sells all sort of medical, sports, beauty and food supplements. They have a storage in Kentucky USA and was chosen mainly because of this remote location, not close to Korea or Finland where the order was made.

Figure 15: iHerb Webstore (Ana, 2016)

The total of the shopping cart ended up being approximately 40 US dollars, which equals to around 45,000 South-Korean Won, this is a basic amount one would shop in an online store during a regular visit.

As the products were chosen, next part was to confirm the purchase and proceed to payment screen. Local mail shipping option was chosen and that added 4 US dollars to the total cost of the order.

The payment went through instantly and the expected delivery time is about 14 days. No problems in the confirmation section.

Defining all what has been learned with the testing using Nielsen's usability research methods, shows that the programs is not completely unusable. Learning to use the thing is easy, but that is one of the biggest parts of the problem. As people adapt to the fact that they

need to download all the required addons they will download absolutely everything that is prompted. Using the program is easy, learning to use it the safe way is way harder.

Efficiency sake the program is not exactly what it should be, the program requires way too many addons to function, which will then slow the computer of the user. Using the way mentioned above, could provide more efficiency in bank payments and make them more fluent.

Having to remember how to use the program is not the problem that users find, because the programs is used every day in the target country. It's been the same since 80's, which means that there are not new things there to learn.

Errors while using the program are sometimes unavoidable, which will make the process slower, but these errors will not make the program unusable, by the definition. How ever if better option were to be provided, most certainly many people would be willing to grasp on it.

Satisfaction of the user while using the program from the past reviews and experiences could be on the better side, even though people are able to use it, it does not necessary mean they should deal with the problems and errors there is.

Based on the usability research results here, it appears that the program is not completely unusable or broken, but instead outdated and in need of better alternative solution.

Using the four-stage usability testing result here, the programs falls in the category four. Serious lack of usability problem. As the program is fully functioning and still does what it's supposed to, it's not falling in the fifth category of catastrophe. Still keeping this in mind and counting all the disadvantages the program is forcing on the user, the stage four usability problem is present here.

All this according to Jakob Nielsen's usability research terms which are as follows:

0 = I don't agree that this is a usability problem at all

1 = Cosmetic problem only: need not be fixed unless extra time is available on project

2 = Minor usability problem: fixing this should be given low priority

3 = Major usability problem: important to fix, so should be given high priority

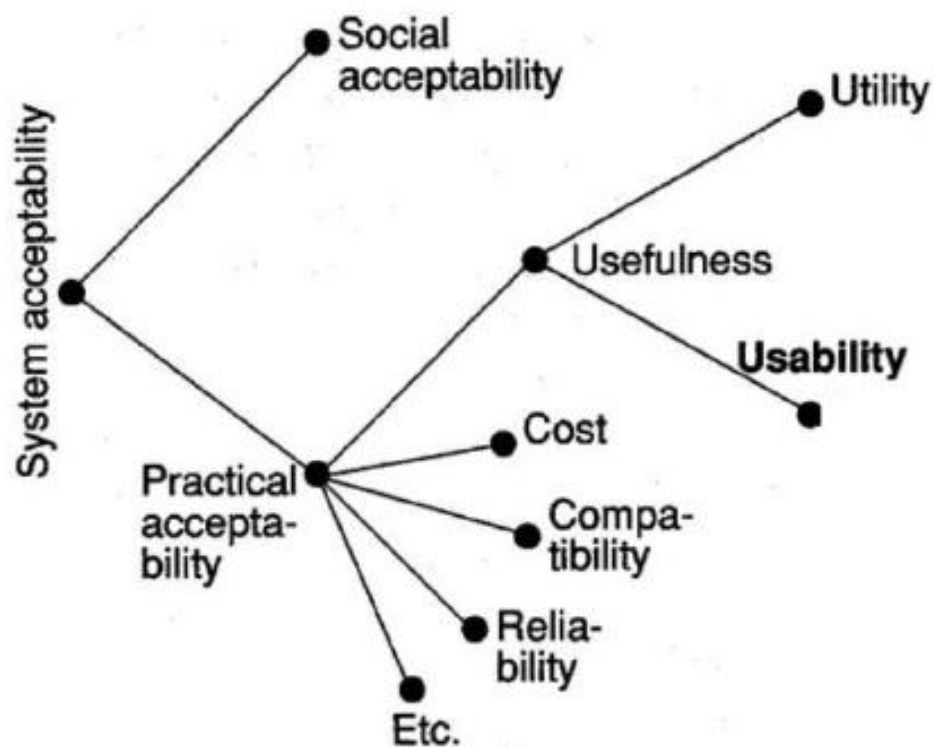**4** = Usability catastrophe: imperative to fix this before product can be release

Figure 16: Usability Research (Andrew U., 2004)

7   Conclusions

Based on the results given from the usability testing and user experiences, the program does not seem to be catastrophically malfunctioning, but still at the level of unpleasant user experience. This leads to the fact that the need for replacement would be in order. The possible short-term advices to go by would be using a VPN service, preferably paid one to access the web from outside Korea and make the transactions using Chrome with Silverlight. This leads to more fluent and secure transactions for payments going outside Korea. As for foreigners having to deal with using Active X related services, using VPN could work as well for outgoing transactions. When it comes to payments or related services going inside Korea, using Chrome here with Silverlight could provide to be a working solution as the ideology behind Silverlight's controls are like those of Active X, and also up to date.

The company can have alternative option for out of country transactions which leads to safer payments and money transfers. By recognizing that the alternatives even exist and the problems the old option brings is gained from going through this thesis. The solution to problem was solved by going around the old method and bringing in the new solution. By using technology that tricks the web servers into thinking that you are not in the place that you're shown to be.

As the going on trend in Korea is now and has been that of using the Internet Explorer with its outdated controls and plug-ins since the 80's, solution for this problem in wide term currently is up to the people to find out that there is another option. The solution displayed here is working for singular persons, but for wide audience the solution must come from higher up, like government officials. This way people would not have to trick their way for a working solution, but instead use something that works the way it is designed.

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Figures

Appendices

Appendix 1: Interview Questions

Together with interviewees the goal was to figure how using the plug-in works in real world, and tests were made accordingly.

Positive results were gathered together.

Negative results were grouped together and processed.

Possible improvements were searched based on the results given.

Appendix 2: ActiveX writing assignment

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Life Improvements

"We can complain because rose bushes have thorns, or rejoice because thorn bushes have roses." -Abraham Lincoln. Current paying system in Korea is notorious for being complicated and almost impossible for foreigners to make purchases within Korea. This is due to the system being too old, problematic, and outdated. There are so many steps you must go through to make a single purchase, these include phone-, email- and bank confirmation. One of the main problems is a program called ActiveX. This program was controversial from the start; while Microsoft claimed programming ease and good performance compared to Java applets in its marketing materials, critics of ActiveX were quick to point out security issues and lack of portability, making it impractical for use outside protected intranets. The ActiveX security model relied almost entirely on identifying trusted component developers using a code signing technology called Authenticode. As the new president of Korea, I will change ActiveX for a better method that is more user friendly, simplify the confirmation procedure and provide international option for foreigner use.

 First, I will change the outdated system of ActiveX to a better one. As of now, the program uses technology from 1996 and is only compatible with Internet Explorer. It has been pointed as the biggest problem, that makes paying system more complicated than it should be. One of the former presidents Moon Jae In made a pledge before being elected, where he promised to get rid of ActiveX. As he failed to change the system, I will take responsibility to tackle this problem. My first assignment is to hire skilled, young enough to understand the current problem and ambitious team of programmers to build a better, ease of use and not outdated system. By having a new program, it would be easy to also solve the other problems of online paying for Koreans and foreigners alike. Updating the ActiveX to a better program will fix the online transaction difficulties.

Second, I will simplify confirmation procedure. Currently confirmation is done with a mobile contract and excludes prepaid contracts. Prepaid contracts are the ones most foreigners use

and the confirmation cannot be done with these. This prevents people from making online purchases, using online services, confirming ages, and using public services; like bikes. One of the ultimate goals as a president is to make the transactions more accessible thus making Korea earn more money. By simplifying confirmation process, Korea will achieve this.

Finally, my goal is to make online transactions and the process international by adding multiple language choices. This will assist visitors of Korea or people outside Korea who wish to make purchases from Korea. Currently most of websites and services are only available in Korean, so if one wishes to access these sites, the language barrier makes it nearly impossible. To achieve this, I will hire translators to provide these sites and processes in multiple languages. By at least having them available in English, will vastly increase the consumers thus growing the income. This will also increase attractiveness of Korea for visitors to come here without the fear of having language problems. Making Korean websites and transaction procedures international will help both Korea and outside world.

To summarize this all, goal to reach here is making Korea more accessible. If these three problems will get solved, it will not only increase Koreas capital but also make Korea more attractive place to visit, get a job, go studying and live in for foreigners. To shorten my plans: Replacing ActiveX with upgraded version will make online purchases less painful. Cutting off unnecessary parts of the confirmation process will make access to services easier. Internationalizing all of this will improve the number of visitors and bring more money to Korea. With all these plans, I am going to make Korea great again!