Measuring Digital Signage ROI

A combination of Digital Signage and Mobile Advertising as a method for measuring Digital Signage ROI

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Spring semester 2010
Bachelor thesis, 15 hp
Abstract

Marketing has changed a lot the past decade. New modern marketing channels have been developed and marketing have become more effective. This has affected the expectations advertisers have on advertising channels. One thing advertisers increasingly expect is to be able to efficiently measure the result of advertising, the ROI. A method for measuring ROI of digital signage is in focus in this study. The measurement is enabled by a combination of digital signage and mobile advertising. First a consumer is exposed to digital signage encouraging SMS interaction in order to receive an electronic voucher entitling the consumer to a discount. If the voucher is used, revenues can be linked to a specific campaign and ROI can be calculated. The study focus on measuring the tendency consumers have to interact through SMS when they get exposed to relevant advertising and the tendency they have to use the voucher that is sent to them as a result of the interaction. The question is how efficient this method is for measuring ROI. In order to bring clarity to the issue, I conducted a quantitative survey using an online self completion questionnaire as measurement tool. It was distributed through e-mail among students at the College of Management at National Taiwan University. Furthermore, I have chosen a deductive approach, my epistemological position is positivism and I therefore utilize the scientific model conducting my research. My ontological position is objectivism meaning that I believe reality is independent of social actors.

The empirical data collected showed that the method in focus have great potential in working efficient for measuring ROI of digital signage. The general tendency to interact through SMS was high, on average 82.3% of the respondents would interact through SMS when getting exposed to relevant advertising. In addition, 96.5% of those would also use the voucher sent to them, enabling ROI calculations.

It was presumed that the digital signage advertising was relevant to such an extent to the consumer getting exposed to it, that he/she already had a purchase intention of the product/service which the advertising regarded. This should be remembered when evaluating the results. Nevertheless, if advertisers succeed in reaching out with relevant advertising enough, the findings in this study indicates that the method is an efficient tool to use for ROI calculations of digital signage.
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Chapter 1 Introduction

In this chapter the topic of this thesis will be introduced. Furthermore the problem background will be described and the problem will be formulated, as well as a research question. In addition the aim with the research will be stated and delimitations will be discussed.

1.1 Introduction

Advertising has changed a lot the past decade. Traditional channels such as TV, radio, magazine and billboard advertising has got new competitors. The new challenging advertising channels are for example online advertising, mobile advertising and digital signage. Of these three, the first one, online advertising, has had a huge impact on changing advertisers demands and expectations of an advertising channel. In particular, advertising through different search engines on a pay per click (PPC) basis has caused these effects. Google is the leading search engine.

Advertising through Google is particularly efficient for companies that sell products or services on-line, at least in terms of the possibilities to measure return on investment (ROI).

When a consumer uses Google to search for a product or service they are interested in, they will type in search words that are related to the product/service they want information about. When the result of the search is shown, advertisements that are associated with the same search words as the consumer typed in will be shown. This will be done because a company has applied Google ad-words. Google ad-words is an application which is used to direct traffic from the search engine to companies web pages, it also enables estimations of ROI. (Google, n.d.A)

The second one, mobile advertising, has contributed a lot to making marketing more personalized. Advertisements are sent directly to a consumer’s mobile phone and if the advertiser has access to some background information of the owner of the phone, they can send a more personalised message that is more likely to catch the consumer’s interest. It is however important that consumers before receiving mobile advertisements has given their permission to the advertiser to send them (Tsang, Ho, Liang 2004, p.6). Otherwise the advertising can have a negative impact.

The third one, digital signage, advertising through digital displays, is a market that is rapidly growing. It has several advantages compared to conventional signage. Those advantages are discussed in Harrison & Andrusiewicz, (2004, p2-3). Conventional signage needs to be created, transported and installed. When that is done one static image will be shown. With digital signage the costs are decreased since the content is digital. No transportation and installation is needed. Furthermore the content can easily be changed and adjusted depending on time of day, weather etc.

A problem with this form of advertising has been to apply methods for measuring ROI. One possible solution of measuring ROI of advertising through digital signage is to integrate a SMS-function (Nead, 2008). When that is done digital signage is combined with mobile advertising. How the combination works is mentioned briefly in the next section and explained in detail in
chapter 3. The combination of digital signage and mobile advertising and its potential, summarize the topic of this thesis.

1.2.1 Problem background

“In light of the global financial and economic crises, there has never been a better time to start a business!” The previous sentence is the first sentence in Pinpoint Medias business plan, a business plan I am a co-writer of. The sentence might contradict some people’s perception of when starting up a business is a good idea. However, when the times are bad companies are very concerned about finding solutions that are cost efficient in order to cut expenses. Pinpoint Media aims to provide such a solution. The content of this thesis is related to the solution Pinpoint Media aim to provide. It is therefore of crucial importance for the reader to be familiar with what the solution includes. Below follows a section explaining Pinpoint Media´s solution followed by a section that formulates the problem that is the centre of this thesis.

1.2.2 PinPoint Media

The concept of Pinpoint Media was developed during a school project and is not yet a registered company. PinPoint Media intends to build up an interactive platform for advertising in taxi cars in Taipei, Taiwan. They will compete on the market for outdoor advertising. LCD touch-screens will be installed in the cars and through them advertisements will be shown. The platform will be constantly on-line, which makes it possible to change the content of the advertisements at any time. Other contents than the advertisements will also be published on the screens, such as news, stock news, sport news, tourist information etc. Pinpoint media offers two different services that secure a high level of relevance of advertisements for the consumer getting exposed to them. Those two services are:

- Interaction based service
- Location based service

As for the interaction based service, there are two different ways for the passengers to interact with the system. The first one is the interaction through the content published. The passengers will on the screens have a number of different contents to choose between to read. They select the content they are interested in reading by touching the screen. The content will then be displayed on the screen and advertisements related to the content will automatically be shown. When touching the screen the passengers are interacting with the system and this interaction has two advantages looking from an advertiser’s point of view. It helps showing relevant advertisements and it generates statistics. The statistics are generated by the passenger either activating an advertisement in order to gain more information, or skipping the advertisement. Pinpoint Media can provide this statistics as feedback to the advertisers, the statistics can be used by the advertisers to evaluate the quality of the advertisements and the interest showed in them and is therefore very useful.

The second way for the passengers to interact with the system is through an SMS-function, which was mentioned in the previous section and can be applied to the platform. The SMS-function works as follows; through an advertisement viewed on Pinpoint Medias platform, a passenger receives an offer of the possibility of getting a special deal. In order to get the deal, the passenger is encouraged to send a free SMS to a number given in the advertisement. The
passenger will then receive an automatic reply with a promotional offer in form of an electronic voucher, including a code. The passenger can then bring the voucher with the code to a sales place and show it to the staff and by doing that receive the special deal, which for example could be a discount on a product. When a passenger interacts with the system through the SMS-function and afterwards use an offer gained through the interaction, the advertisers has the possibility to collect statistics themselves at the different sales places, statistics that can be used to determine revenues generated from a campaign. That kind of information is obviously of great benefit for the advertisers. This application will in this thesis from now on simply be referred to as “the SMS-function” or “SMS-function”.

Pinpoint Media also provide a location based service. Apart from the possibility of showing relevant advertisements based on interaction between passengers and the platform through the content published on the screen, Pinpoint Media can also show advertisements based on the taxis location/destination. If the passengers chose not to interact with the system advertisements based on the taxis location/destination will be shown on the screens. The content of the advertisements shown can be correlated with a specific geographic place or area, which is chosen by the advertiser. The location based service is another way for Pinpoint Media to secure that relevant advertisements are shown.

1.2.3 Problem formulation

For an advertiser there are two issues that are of great importance when it comes to choosing a channel to advertise through. Number one is to reach out to relevant people with the advertisements, and number two is being able to measure the result of that advertising, both in terms of the awareness it creates and economical result, the return on investment (ROI).

In Tellis (2004, p.5-6) it is explained why advertising is hard to evaluate. A combination of factors makes it hard to accurately measure the effectiveness of advertising campaigns. One factor mentioned is that consumers purchase products for several different reasons such as past satisfaction with a product or word of mouth recommendations, not necessarily just because they have been exposed to an advertisement for a product. Another factor mentioned is that campaigns can be going on in different media at the same time. Evaluating the effect of specific campaigns is then rather complicated since it is hard to know which campaign that made the consumer execute the purchase.

When reviewing the literature on measuring advertising effectiveness, I looked at a sophisticated statistical measuring method of advertising ROI. This model is developed by Rust, Lemon and Zeihaml (2004). This model is price awarded and very complex. The efficiency of it can however be questioned. How successful advertising ROI measurement can be obtained with the model is depending on companies’ abilities to estimate awareness that campaigns create, and more importantly, that companies can identify if the awareness leads to purchases. The latter is very hard to measure since it involves human mental processes (Tellis, 2004, p.43-48).

Advertising through digital signage platforms in general, is a more effective way to expose individual consumers to for them relevant advertisements compared to traditional outdoor marketing channels. Furthermore, theoretically, the effectiveness of the exposure is economically measureable.
Advertisers does, even though applying digital signage advertising, face a great challenge in succeeding with exposing consumers to relevant advertisements. The design of the advertisements and choice of platform is two important factors that affect advertisers’ success. How to reach out to a target group of people is however not the focus of this thesis. This study will focus on how efficient ROI can be measured when advertising on a digital signage platform. One potential efficient way of measuring digital signage ROI is enabled by the SMS-function which can be applied to Pinpoint Media’s platform and other digital signage platforms.

When this kind of SMS-function is applied to a digital signage platform, mobile advertising is combined with digital signage. This is theoretically a way to measure ROI of digital signage advertising. Pinpoint Media’s platform, is the platform that has been chosen to represent digital signage platforms for this study. This study will on a general level examine if the SMS-function, when applied to a digital signage platform, i.e. combining mobile advertising and digital signage, is an efficient tool to use for measuring ROI of digital signage advertising.

To enable such measurement it is necessary to presume that the advertising content is relevant for the consumer getting exposed to it. How consumers behave when getting exposed to relevant digital signage advertising is what determines how efficient digital signage ROI can be measured. If the tendency to interact with digital signage advertising, through SMS, is low even though the advertising is relevant, the method is inefficient. Two central questions in this thesis are: To what extent are consumers stimulated to interact with a relevant digital signage advertisement, through SMS, after exposure? If interaction occurs, will consumers use the electronic voucher that is sent to them? To measure ROI of digital signage advertising by applying the SMS-function, interaction is necessary. A consumer getting exposed to an advertisement that contain no relevant information for that particular consumer is of no interest for this study, presuming that such a consumer will have no tendency to interact with an advertisement through a mobile phone. However, consumers that might interact with an advertisement are interesting for this study. Based on the previous presumption the consumers interesting for this study are the ones that get exposed to advertisements that from the individual consumer’s point of view have a relevant content. The higher the rate of interaction with relevant advertising followed by usage of the voucher sent, the higher is the efficiency with which ROI of digital signage can be measured. Therefore, consumers’ tendency to interact through SMS with digital signage advertisements containing relevant content, in order to gain a promotional offer in form of a voucher, is what will be examined. In addition it will be examined if the voucher sent to the consumers as a consequence of the interaction will be used.

To clarify: The higher tendency consumers have to interact with a relevant digital signage advertisement through the SMS-function and the more vouchers that are sent to consumers as a consequence of that interaction are used, the more efficient can ROI of digital signage advertising be measured. The more efficient ROI can be measured, the more attractive is the platform to advertisers. Hence, the higher tendency consumers have to interact with a relevant digital signage advertisement through the SMS-function and the more that interaction facilitates usage of the voucher sent, the more attractive is the platform to advertisers.

1.3 Research question

How efficient can ROI of digital signage advertising be measured when combining digital signage with mobile advertising?
1.4 Research aim

The effectiveness of different advertising channels has increased drastically the last decade and to be able to compete on the modern advertising market expectations from advertisers needs to be met. One of the main expectations advertisers has on modern advertising channels is that it should be possible to efficiently measure the ROI of a campaign. Thus, the aim with this study is to determine how efficient ROI of digital signage advertising can be measured. This in order to get an understanding of how well digital signage platforms can meet the expectations advertisers presently has and in the future will have on advertising channels.

1.5 Delimitations

This study is only focusing on the Taipei market and it can therefore be misleading to interpret the result of this study on a general level. Factors such as the differences in adoption of new technology in different parts of the world might influence consumers’ behaviour.

In addition, the concept of PinPoint Medias cannot be said to be representative for all digital signage platforms. One reason is the exposure environment. Exposing consumers to advertising in the backseat of a taxi might affect consumers’ behaviour if comparing it with exposing consumers walking on the street for example.

Also associated with the choice of platform: to be exposed to advertisements in the backseat of a taxi, consumers are required to actually take a taxi. This could mean that the choice of PinPoint Medias platform would exclude certain consumers never taking a taxi, whom would not be excluded if another platform would be used. This is however an issue that not affects this study due to methodological reasons associated with this study, such as presuming that consumers getting exposed to relevant advertisements sitting in a taxi when measurement is being done. Furthermore, taking a taxi in Taipei is cheap and therefore the frequency with and the demographic spread of people taking a taxi is a lot higher and wider respectively, than compared to Scandinavia for example. Therefore the impact of this issue would have been minor even without presumptions such as the one mentioned above.

Despite some delimitations, I still believe that it is a wise decision to use PinPoint Medias solution as the representative for digital signage platforms within the framework for this study. First of all the SMS-function is applicable to any digital signage platform. Furthermore, advertising in general is developing towards higher degree of personalization and interactivity, which is something PinPoint Medias solution, although only on an abstract level, already today has a great degree of. The exposure environment is a way to increase that degree. Therefore, the result of this study might have a higher level of representativeness within a short future.

An alternative approach would be to use another digital signage platform with a present higher general representativeness such as a platform including screens in a mall. However, I consider that kind of platform to be of less interest since it lacks the positive features of the exposure environment of PinPoint Medias concept.
Chapter 2 Theoretical Method

In this chapter the choice of subject will be explained and preconceptions will be discussed. Furthermore, the research strategy will be defined and usage of secondary sources will be discussed.

2:1 Choice of subject

The choice of subject for this study is highly correlated with personal interests. During a previous school project I started to gain an interest for digital signage advertising platforms. The school project eventually resulted in a more serious plan on starting up a business. That plan still exists and the future will tell what will happen to it. Right now, together with collaborators I have further developed a concept of an interactive digital signage platform, tailored to fit the Taipei market. The concept is fully developed and all the necessary components such as hardware and software already exist. A commercialisation of the concept is therefore a realistic scenario. Gathering data regarding the potential benefits of digital signage platforms that is the focus of this study, is therefore of great interest for me personally.

2:2 Preconceptions

Personal values of a researcher will always to a degree influence the research performed. The values can affect a researcher to a less or greater extent, but values cannot be put aside when research is accomplished. Values can influence research at any part of the research process, when choosing what to research, how to do it and when analyzing and interpreting data.(Bryman and Bell 2007, p.29-30)

There are no doubts about that my personal interests has had an effect on the choice of research in this thesis. The preconceptions regarding digital signage advertising I possess are all on an abstract level. Therefore, I have an open mind attitude towards the research. I am very well aware of that theory and practice may differ a lot. The aim is to stay as objective as possible when the research is being performed.

2:3 Research approach

A deductive approach has been chosen for this thesis. A deductive approach is when the research begins with what is already known about the subject of research. Previous theories are used to deduce hypotheses which are empirically tested. In other words, the research is a result of theory. Furthermore the researcher needs to make the hypotheses measurable in order to be able to collect data. (Bryman and Bell 2007, p.11) Empirical specify that the data has been gathered systematically and through direct data collection (Black, 1999, p.3).

For this study the choice of approach is logical since the aim is to, based on previous theories regarding digital signage and mobile advertising etc, form hypotheses and then empirically test them. Accordingly, theory will in this thesis be tested.
The alternative approach would be to use an inductive approach. In Black (1999, p.8), how to form theories by induction is discussed. The process is described as: data collection through observation, to recognize general patterns, and relationships are then proposed. This way theory is formed. The inductive researcher forms a theory by generalizing outcomes of previous research of the research subject (Bryman and Bell 2007, p.13-14). Since the aim with this study is to test, rather than forming theory, an inductive approach is not appropriate.

2:4 Research philosophies

An epistemological position describes a researcher’s view of knowledge. In other words, what does the researcher accept as knowledge within a certain area? (Bryman and Bell 2007, p.16) A central question is if the social world and natural science can be studied using the same principles and procedures i.e. using the scientific model (Bryman, 2008, p.13).

My epistemological position is positivism. A researcher of the social world taking a positivistic position, applies the same procedures and methodology as used in natural sciences (Cohen et.al.2007, p.10)

The main reasons for my position are that a positivistic view of knowledge includes the principle of deductivism which says that theory is meant to form hypotheses that are tested in order to test the theory. Furthermore, the positivistic view presumes that research can be performed in an objective way. (Bryman and Bell 2007, p.16)

This view of knowledge is logical in this case since a deductive research approach has been chosen. Hypotheses will accordingly be formed by theory. Moreover, the positivistic presumption that research can be performed objectively matches my aim. However, I am aware of that personal values will affect the research. Regardless of that, the intention is to conduct the research objectively.

Alternative positions, realism and interpretivism, is not in agreement with my view of reality.

Realism claims that the reality seen when conducting research is superficial and by conducting research reality is only possible to understand rather than seeing it (Bryman and Bell 2007, p.18). In Brown et.al (2007, p.52) a researcher with a realism position, is described to have a strong believe that there is an external reality beyond the data that has been observed by using scientific methods. I however, view the matter differently. I believe that reality can be seen when research is conducted. In this case, the reality that will be seen is based on the occurrence of a series of ideal events. Those ideal events are ideal because of presumptions made. As long as the presumptions made are reasonable i.e. what is presumed can occur in the reality, the outcome of the research will still reflect the reality and can therefore be considered to be knowledge.

Interpretivism is an opposing position of positivism. Researchers taking that position are reluctant to using the scientific model when examining contexts of the social world.(Bryman and Bell 2007, p.17) As already mentioned, the intention with this study is to test theory rather than forming it, therefore Interpretivism is a epistemological position that is contrasting to mine. Without applying the scientific model to this study, theory cannot be tested.

Objectivism is my ontological position. The ontological position refers to how a researcher views the reality (Bryman and Bell 2007, p.22). Objectivism as an ontological position when applied
means that: the researcher believes that social phenomena are not affected by social actors (Bryman and Bell 2007, p.22). In other words, when research is conducted, results are showing a reality that is unaffected by the social actors that has been observed. This belief is not shared if constructionism is the ontological position of researchers. They believe that social phenomena are created by social actors and that the reality thereby is constantly changing (Bryman and Bell 2007, p.22-.23). When conducting research, the results thus show a reality that both are created and affected by the social actors observed. I do believe that the reality shown through research is a reality that is not the creation of social actors. I believe that the reality shown through research is a result of a given way for social actors to act given a certain situation, and that reality itself is not changing, only the approaches used to show it. Hence, I do not share the view of reality of researchers applying constructionism as their position.

2:5 Research strategy

To summarise the previous sections of this chapter, I have chosen a deductive approach, furthermore my epistemological position is positivism and my ontological position is objectivism. These research characteristics are strongly associated with a quantitative research strategy (Bryman and Bell 2007, p.28), which is also the strategy I have chosen. When using a quantitative research strategy quantification is central when data is being collected and analyzed, whereas when using a qualitative strategy words are more vital (Bryman and Bell 2007, p.28). Furthermore, a qualitative research strategy normally includes different epistemological and ontological positions compared to a quantitative strategy. In addition, the research approach is often inductive. (Bryman and Bell 2007, p.28)

In this case, choosing a quantitative research strategy is logical, taking into consideration the research approach and the epistemological and ontological positions of the author.

2:6 Secondary sources

Since the research is quantitative, secondary sources play an important role. A secondary source is when referring to the work or experience of somebody else (Leth and Thuren, 2000, p.19). The secondary sources that have been used are of various kinds. Mainly they consist of scientific reports and articles published in journals, and of books. The scientific reports and articles have been found through the data base business source premier and through Google scholar. Furthermore, the books have been found through: searching online through Google for example, by searching at different libraries and through recommendation.

Other non-scientific sources have also been used, such as articles and web pages. That information has been found through Google.

Key search words that has been used in different combinations are: Outdoor advertising, Digital signage, Mobile marketing, Mobile advertising, SMS-advertising, Advertising effectiveness, Return on investment, Interactive marketing, Interactive advertising.
2.7 Critic of secondary sources

Historically when criticizing sources, it has been done based on four criteria: time, authenticity, dependency and bias. These criteria are still used when criticizing sources. The time issue regards the importance of the information referred to being up to date. The issue of Authenticity simply regards if the information presented in a source is actually true. The Dependency issue regards if a secondary source is referring to another source which is referring to another source and so on. The source is in such case dependent and not independent. The primary source should be used if possible in order to reduce the risk for errors in the information presented. The bias issue regards if the source is not being objective or presents information that is inaccurate in anyway. (Leth and Thuren, 2000, p.18,20, 23-24,26)

To avoid concerns associated with the time issue, sources presenting information that is reasonably up to date has been used to as great extent as possible. However, since the topic of this study is associated with modern forms of advertising that are rapidly developing: even sources that were recently created can in some cases include some information that is not up to date.

As for the authenticity and bias issues, such problems has been tried to be prevented from occurring by using reliable databases when gathering data.

When it comes to problems associated with the dependency issue, they have not occurred in such cases that it has been assessed to be necessary to find the primary source in order to determine the accuracy of the information. For example, Schumann and Thorson (2007) that is used as a secondary source in the theory chapter of this study have a reference regarding the AIDA model: when it was created, by whom what it consists etc. Since the steps of the AIDA model is what is of particular interest for this study and those steps are widely used and known, it was assessed to be unnecessary to find the primary source to scrutinize the information.

When it comes to criticizing internet sources Leth and Thuren (2000, p.31) presents a few additional criteria to the already mentioned ones that the criticism of a source should be based on. One of those criteria, which is of particular relevance for this study, is credibility. Because of the numerous sources that can be found on the internet, the credibility a source has needs to be assessed in order to determine if the information is of high quality or not. For example it is important that the source is being objective.

As mentioned, some non-scientific sources have been used in this study.

An article written by Nate Nead, which was found through Google, seems not to have a scientific foundation. However, the content of the article is highly relevant for this study since it regards the benefits of digital signage with integrated SMS-interaction. The article describes with great accuracy the very essentials of this thesis. No scientific article that was processed possessed the preciseness with which Nate Nead describes potential benefits with the matter that is to be examined in this thesis. In that sense, the article plays a central role. It can of course not be overlooked that the credibility of such an article is less compared to a scientific article. However, since the topic of the article is very narrow and it describes a potential concept and potential benefits of it, scientific articles that tends to be more general, is unlikely to contain as precise information. The content of the article was assessed to be credible due to the logic of it but also
because some parts of the article being congruent with scientific articles processed, especially regarding permission based mobile advertising. In addition I contacted the author through e-mail and asked for additional information associated with the article and found out that he is working at a company providing overall digital signage solutions. I saw no reason to question his competence and knowledge. Hence, the article was assessed to be relevant to use.

Information found at google.com and betalaperclick.se has also been used. Both are internet web pages that are not scientific or objective in the way they present information. However, both sources present interesting facts regarding pay per click and the advantages with that system. There is no reason to question if the facts presented on the two web pages are correct. They are both congruent with each other and with scientific sources processed. However the scientific sources processed lacked information regarding how ROI can be calculated. Since that is information essential for this study the information found on the two web pages were assessed to be more relevant to use.
Chapter 3 Theory

This chapter will define or explain the concepts, outdoor advertising, digital signage, mobile advertising and interactive advertising. It will also present results of previous relevant studies within these areas. Furthermore, how to measure advertising effectiveness and models developed for this purpose will be discussed. In addition, ROI as a concept will be explained and a theory regarding the advantages of the combination of digital signage and mobile advertising will be presented. Finally hypotheses and a research model will be presented.

3.1 Outdoor advertising

Outdoor advertising or out of home advertising, is the oldest form of advertising and it is a very wide concept. It includes channels such as billboards, super boards and transit shelters (Bhargava & Donthu, 1999, p.2). Outdoor advertising can be seen everywhere, but it is mainly concentrated to areas that gathers a lot of people or areas that people pass by.

Lichtenthal, Yadav & Donthu (2005, p.2) divides outdoor advertising into four categories: billboard advertising, street furniture, transit and alternative forms. The most common form of outdoor advertising is billboard advertising and that is further categorised into several different categories based on size of the posters. There are also a lot of different electronic billboards that makes billboard advertising as a concept even wider. Street furniture advertising is advertising in bus shelters or on displays in shopping malls and sidewalk posters for example. The third category, transit, is advertising in airports subway stations and also on buses and taxis and everything and everywhere else that is associated with transport. The forth category, alternative forms, includes all other forms of outdoor advertising; such as, digital displays, movie theatre advertising, arena advertising etc. (Lichtenthal et.al. 2005, p.2)

An advantage with the outdoor advertising medium is that advertisements can be placed near a sales place which makes the advertisements stand out more, and it also creates the possibility for synergetic effects on sales (Woodside 1990, p.1).

Another advantage with outdoor advertising compared to other mediums, is that the consumers can not change the channel as they can do when getting exposed to advertising for example through television (Lichtenthal et.el. 2005, p.2-3)

There are also challenges associated with outdoor advertising. The consumers getting exposed to the advertisements are often moving, this means that there is very little time to deliver the message. (Lichtenthal et.al. 2005, p.3)

Of the four categories of outdoor advertising Lichtenthal et.al.(2005, p.2) determines, the forth category, alternative forms, is the most interesting one for this study since it includes advertising through digital displays. Below follows a section in which this concept is further elaborated on and explained.
3.2 Digital signage

Digital signage is a way to, through digital displays, spread information such as advertisements. It is popping up everywhere where there previously have been traditional forms of signage or advertising, for example in malls and at airports and even on the streets. Traditional posters are replaced with digital screens. This is of course happening because there are a lot of advantages with digital signage compared to conventional signage.

Conventional signage first need to be created, then delivered to the place of the signage and then it needs to be installed. The advertiser both have costs associated with the creation of the signage (ad designer and material) but also costs for the transportation and installation. This process is furthermore time consuming. Sometimes it is so time consuming that an advertiser that needs to send his message to consumers fast in order to be able to gain revenues, cannot do it in time, consequently, revenues are lost. When the conventional signage has been installed, the same advertisement will be shown until it is taken down. For digital signage the costs for creation of the signage, transportation and installation compared to the same costs for conventional signage are very low, since the content is digital. The content can also be changed easily, that makes it possible to correlate the content shown on the display with for example time of the day. (Harrison & Andrusiewicz, 2004, p2-3)

Looking from an advertiser’s point of view, digital signage is cost-efficient. If the digital signage displays are connected to a network, the costs for everything but the design of the advertisements are actually avoidable since the content then can be uploaded through the internet (Harrison & Andrusiewicz, 2004, p.3-4). Furthermore, it increases the relevance of the content of the advertisements showed compared to conventional signage.

In an article written by Nate Nead, it is discussed why digital signage is growing fast and current challenges associated with it. It is pointed out that the main reason for digital signage now growing rapidly is the affordability that recently has increased since prices on the screens used has decreased. Nead furthermore describe Real estate to be very essential to the concept of digital signage since that is where the screens are placed. In the article it is stated that: “Right now, there is a race to capture as much real estate as possible.”(Nead, 2008).

This capture is in order for providers of platforms to lock as much attractive advertising space as possible. Even though real estate can be essential and probably in most cases are, it is not always a requirement when building up a platform for digital signage. One example of that is Pinpoint Media´s solution. The screens are placed in taxi cars and real estate is not involved. It is also possible to utilize buses as the foundation for digital signage platforms.

Platforms that are installed in taxis or buses are examples of mobile digital signage platforms. These kinds of platforms can be advantageous compared to stationary platforms for example when it comes to showing content based on a screens location. A location based service applied to a mobile digital signage platform has a possibility of being associated with a consumer’s destination with help of GPS technology. When the screens are installed in a bus, advertisements linked to a bus stop can be shown: the advertisements will then in terms of location be relevant for passengers getting off at that particular bus stop. The possibility of showing content relevant to a passenger’s destination exists also in taxi cars. It is in fact even greater since the destination in most cases is known by the taxi driver when the trip starts. If the destination is typed in by the
driver on a GPS, it is possible to associate the signage with the destination. In addition it is possible to show content relevant to all the locations past on the way to the destination, which is of course also possible to do in buses. When content is showed based on the screens location on stationary unit of a digital signage platform, the content is limited to be related to only one location since the screen is not moving. Mobile digital signage platforms can be used for mobile advertising. The most common form of mobile advertising is however done through hand held devices. The next section will explain that concept.

3.3 Mobile advertising

Mobile marketing can be defined as “using interactive wireless media to provide customers with time and location sensitive, personalized information that promotes goods, services and ideas, thereby generating value for all stakeholders” (Hagmilian, Madlberger, Tanuskova 2005,p.2). One form of mobile marketing is mobile advertising. Mobile advertising is advertisements delivered through a mobile device (Yang 2007, p.1). The mobile devices are usually mobile phones and the advertisements are sent to them via short message service (SMS).

Especially interesting for this study are the mobile advertisements that are sent to consumers only after getting their permission to do so. This is called permission based mobile advertising (Tsang, Ho, Liang 2004, p.4). Consumer’s attitude towards mobile advertising is in general negative; however, when the advertisements are sent to consumers after getting their permission, the attitudes are more favourable (Tsang et.al. 2004, p.6). This is supported by a study made on the effectiveness of different kinds of location based mobile advertising. It is concluded that when a consumer explicitly requested advertisements to be sent to the mobile device, it is regarded to be less intrusive, even though the intentions from consumers to use location based mobile advertising in order to gain value appears to be low. (Unni and Harmon 2007,p.14-16)

Another study measured the general acceptance, interest and perceived relevance of SMS-campaigns among consumers. It showed that the level of acceptance was quite high, 44%, the advertisements where among 16.5% of the respondents considered to be interesting/very interesting and 16% of the respondents regarded the advertisements to be relevant/highly relevant for them. Correlation between: Interest and acceptance, as well as for acceptance and relevance where found. (Trappey & Woodside, 2005,p.3-5)

It appears like the SMS-advertisements in the case of Trappey & Woodside, where sent to the consumers without them giving their permission. The high level of people finding it acceptable to receive them is therefore interesting. Together with the correlation between interest and acceptance and the correlation between acceptance and relevance, it implies that a large part of the consumers might not mind giving an advertiser their permission to send them promotional offers via SMS, as long as the content is relevant and interesting.

The SMS-function, when applied to a digital signage platform, allows consumers to interact with advertisements and thereby give advertisers permission to send them additional information about a product/service and/or send them promotional offers. The findings in the studies regarding permission based mobile advertising are therefore indeed of great interest for this study. By giving consumers the option to decide themselves if to receive promotional offers through their mobile phone, advertisers have the opportunity to reach out to consumers in a non-intrusive and appreciated way. In the next section interactive advertising will be discussed.
3.4 Interactive advertising

Another, for this study, interesting kind of advertising is interactive advertising. Making advertisements interactive has several advantages. One is that if a consumer chooses to interact with an advertisement in order to gain information, the advertiser is advertising for a consumer that has already showed interest and the advertiser can then focus on delivering more detailed information regarding the product, and do not have to put the effort into creating interest. Involving consumers also create more awareness of a brand. (Springer, 2009, p.33,81)

Interactive advertising are for many people associated with internet advertising. Internet indeed is a platform suitable for interactive advertising. Some of the interactive advertising formats that can be found online are: banner ads, key-word search, and rich media. Banner ads are display advertisements. Key-word search is done through Google and yahoo for example and rich media is audio and video advertising, through YouTube for example. Banner ads used to be the most popular format but have now decreased in popularity in favour of key-word search and rich media. (Shumann and Thorson 2007, p.210-211)

These formats are all interactive and consumers’ interaction can be measured in click-troughs and comments etc. A couple of benefits associated with interactive advertising has already been mentioned, but perhaps the biggest advantage is the tracks that consumer leaves when interacting. These tracks can be used to analyze advertising effectiveness in terms of creating interest and awareness and in some cases the impact on sales. If comparing internet advertising with broadcasted commercials, in general, internet advertising has a greater proportion of exposed people converted to customers while broadcast commercials have a greater reach (Springer 2009, p.57). The interaction sometimes makes it possible to show more relevant advertisements, it can be done by relating the advertising to the content displayed for example.

A study that measured effectiveness of SMS-advertising looked at the possibility for consumers to interact with an advertisement in order to get more information as a potential positive stimulator for consumers’ attitudes towards a product. This however proved to be wrong and the attitudes toward the product showed to be more negative when an interactive feature was added to the advertisement. (Drossos, Giaglis, Lekakos, Kokkinaki and Stavraki 2007, p.4,10-11)

In the case of Drossos et.al. (2007), the advertisement showed to the consumers was not of interest or relevance for everybody that got exposed to it. The SMS-function will when applied to a digital signage platform, encourage consumers to interact with the system through their mobile phones by sending an SMS. This interaction is crucial in order to offer advertisers a possibility to estimate the ROI. In the case of Drossos et.al. (2007), an interactive feature did not have the wished effect, however, Shumann and Thorson (2007, p.210) argues that the participation of a consumer in gaining information, by for example interaction, is depending on the willingness of the consumer to do so, but it also depends on the advertisers ability to stimulate the participation by providing accurate formats of advertisements. It may be more likely that an interactive feature, have a greater potential of contributing to consumers positive attitudes towards a brand and interest in gaining more information or a promotional offer sent to a mobile phone, when applied to a platform that secures that the advertisements shown are relevant for the consumers exposed to them.
The study made by Trappey and Woodside (2005) mentioned in the previous section, also measured the degree to which people respond by sending an SMS when they are encouraged to. Different mediums were included in the survey including advertisements of any kind. The findings showed that 4% of the respondents had sent an SMS as a response to an advertisement of any kind. Furthermore, it is shown that the SMS-response rates are in general increasing over time. (Trappey & Woodside, 2005, p.8-12)

This low percentage of respondents does not speak in favour of the likeliness of a high percentage of consumers being willing to interact through the SMS-function. However, since the study is from 2005 and the general response rates are increasing over time, they can be expected to be higher now. Furthermore and once again, high relevance of the content of advertisements for the consumers getting exposed to them might be a factor that increases the interactivity rate.

### 3.5.1 Measuring advertising effectiveness

Criteria to use in order to measure advertising effectiveness have been discussed for more than one hundred years. In 1898 the AIDA model was created by Elmo St. Lewis. AIDA stands for Attention, Interest, Desire and Action and represents the steps in the consumers mental processing of advertising. This model has been further developed during the last century. In the 1960s Lavidge and Steiner established the “hierarchy of effects”, which includes three steps: cognition, affection and behaviour. Cognition basically means knowing, affection refers to emotions and attitudes towards something and behaviour refers to actions taken, such as a purchase. The essential of the model is that the first step leads to the second and the second to the third and the order of the steps are always the same. For example: affection always comes before behaviour when a consumer processes information. This has later been criticized and research has concluded that there is no linear connection between the three steps. Nevertheless, all three criteria are used when measuring advertising effectiveness. (Schumann and Thorson 2007, p.205-207)

These models are useful to gain a general understanding of how information is processed by consumers. How that processing is linked to advertising and outcomes of advertising on a more practical level is discussed by Tellis (2004).

### 3.5.2 What can be measured?

Consumers respond to inputs, which basically is the advertising, and that information is processed and the result of that processing is the outcomes of the campaign. The input, process and outcomes are all measurable, even though the extent to which they are measurable differs. Measuring inputs refers to measurement of advertisers expenditures, both in terms of the actual amount of money spent but also in relation to the total amount spent on advertising on the particular market. Furthermore, exposure rates, advertising channels and the advertisement content are variables taken into consideration. Measuring consumers’ processes are about measuring consumers’ awareness of a brand or product, emotions associated with it; and purchase intention etc. Measuring the outcomes is measurement of consumers’ behaviour in terms of purchase, re-purchase and switching to a new brand as a result of being exposed to advertising. Moreover, frequency and quantity of purchases are measured. In addition, companies’ sales, revenues and profits are measured. The inputs and outcomes are easy to
measure in comparison to processes. This because the two first ones includes taking actions that can be seen and analyzed, whereas the processing is done on a mental level, and is therefore hard to measure. (Tellis 2004 p.43-48)

Measuring the effectiveness of advertising is a very complex process and it is done by taking many different aspects and variables into consideration. In the introduction chapter of this thesis, it was stated that advertisers are concerned about two major issues when choosing an advertising channel: how to reach out to relevant people with the advertisements and being able to measure the result of the advertising. The inputs and the consumers processing of the advertising are associated with the first issue and the outcomes are associated with the second issue. Reaching out to relevant people with advertisements is important in order to achieve increased sales or revenues, which basically is the goal with all advertising. This study is in particular focusing on methods to measure the outcomes of advertising. More precise, on methods for determining sales and revenues generated by specific advertising campaigns.

In Tellis (2004), it was stated that outcomes of advertising could be measured relatively easy, especially sales and revenues of a company is said to be easily obtained since they can be found internally.

However, even though the numbers are easy to obtain it is extremely hard to know which sales and which revenues that are associated with a certain advertising campaign. Furthermore, it is quite impossible just to look at general sales and revenues and draw any conclusions regarding advertising campaigns. For example, in bad times sales and revenues might be decreasing despite an ongoing advertising campaign due to a current economic recession. Should it then be concluded that the advertising campaign have a negative impact on sales and revenues? That does of course not make sense. What are needed are methods for measuring outcomes of advertising that can determine which sales and revenues that are associated with a certain campaign.

3.5.3 Statistical measurement

There are advanced statistical models that are being used for measuring outcomes of specific advertising campaigns. Rust et.al. (2004) have developed a model that can be used for this purpose. According to the model, marketing investment results in a change/improvement of so called drivers. A driver is for example the awareness advertising creates. This improvement will improve customers’ perceptions which will lead to increased customer attraction and retention, which leads to increased customer life time value, which will lead to increased customer equity. Customer lifetime value (CLV) is the value a customer represents for a company, basically how much money a company can earn from a customer. Customer equity is the sum of a company’s total CLV. The increased customer equity is the return on marketing investment i.e. the outcome of the advertising. (Rust et.al. 2004, p.2,4)

The efficiency of the model could however be questioned. According to the model, when a driver, e.g. improved advertising awareness, changes due to marketing investments, the customer equity increase (Rust et.al. 2004, p.7). This sounds reasonable. Furthermore, the shift in a driver generated by marketing investments, e.g. awareness of a brand created by advertising, need to be estimated by the company implementing the model (Rust et.al. 2004, p.8). This is probably also possible to do with reasonable accuracy. However, it is assumed that companies can identify how
drivers influence consumers’ decision making, e.g. how increased advertising awareness affects consumers’ consumption (Rust et.al. 2004, p.5). Basically this means that the complexity of measuring consumers mental processing that was discussed in Tellis (2004) is not something that the model takes into consideration. This very important part of measuring advertising effectiveness, namely how the second step in the hierarchy of effects “affection” leads to the third step “behaviour”. This is left to the company implementing the model to deal with. The accuracy of the results when using this model is therefore heavily depending on the company’s ability to do this kind of measurement/estimation. If the company can do accurate estimations, the model does have a potential of working efficiently. Two things should be remembered though: 1) The mental processing is really hard to measure and therefore also hard to estimate. 2) This is a model used for estimating ROI and not determining ROI.

### 3.5.4 Instantaneous and carryover effects

Tellis (2004, p.4-6) suggests a method for measuring some of the revenues generated by a specific campaign. Advertising is said to have both instantaneous effects, which means that the consumer responds immediately after exposure, and carryover effects, which means that the response is delayed and thereby harder to link to a certain campaign. The instantaneous effects is said to be measurable for example by having a special phone number in the advertisement to which the consumer can call and buy the product. The revenues can then be directly linked to a specific campaign. If the product instead is bought as a result of a carryover effect of the same campaign, a consumer might for example buy the product in a store at a later occasion and no trace that can link the purchase to the campaign will then be left.

The issue regarding the carryover effects is only partly associated with measuring the economical result of advertising campaigns. It is also associated with how to reach out with effective advertising. However, in this study, the part of the issue associated with measuring the economical outcome of a campaign is relevant. Looking from that point of view, there is no reason to question if advertising have both instantaneous and carryover effects. However, it is definitely questionable if it can be said that only the instantaneous effects of an advertising campaign can be measured by using the telephone number-method described. The reason is that just because the consumer responds to the advertisement by calling and making a purchase, it cannot be determined that the respond is instantaneous. Making the phone call could be a carryover effect from previous exposures. Therefore it is reasonable to say that both instantaneous and carryover effects potentially are measured with that kind of method.

The discussion above is applicable for the particular method for measuring economical outcomes of an advertising campaign, which is going to be tested in this study. Since a voucher will be sent to the consumer through the SMS-function when consumers chose to interact with an advertisement, the possibilities of including consumers acting due to a carryover effect when measuring the economic result of a campaign should increase. This since the voucher can be saved and used at a later occasion, possibly after more exposures to advertisements for the same brand or product. However, both with the method that will be tested in this study and with the telephone number-method described earlier, it is not possible to distinguish between the revenues generated by consumers responding instantaneously and as a result of carryover effects. However, such distinction is not necessary to do if the aim is to measure revenues associated with a specific campaign. Because of the unique code that will be used in the vouchers sent to
consumers through the SMS-function, the revenues can even if generated by repeated exposures to different campaigns for the same brand unarguably be associated with the campaign that makes the consumer execute the purchase. The revenues are therefore at least partly generated by that campaign.

The carryover effect-issue is probably impossible to overcome if the goal is to determine which campaign generated what exact revenues. In particular if several advertising campaigns are going on simultaneously. In addition, not only advertising campaigns impacts what consumers purchase. Past satisfaction with a product and recommendations are other factors that have an impact Tellis (2004, p.5-6). That makes the issue even more complex. However, even though it is important to be aware of the issues existence, it should not be given too much attention since valuable information can still be obtained.

3.5.5 The importance of company size

It is hard to say with what accuracy the existing statistical model for measuring outcomes of advertising developed by Rust et.al. (2004), actually can obtain satisfactory results. However, clear is that the company’s, which implement the model, own ability of measuring consumers mental processing, is determining if reasonable estimations can be obtained. It is a qualified guess that all companies do not have this ability. Big companies with a lot of resources might have it, but it is doubtful if small companies do. Hence this model is not suitable for all companies, maybe even just a few. In addition, the implementation process of this model is quite complex and includes comprehensive data collection (Rust et.al. 2004, p.7). It should be preferable for many companies to implement methods that measure actual outcome of advertising, which are easy to implement, with which the size of the company does not have an impact on the ability to measure outcomes. The method that is being examined in this study is potentially such a method. Even for companies that fully can take advantage of statistical models, complementary methods are obviously useful.

Methods for determining sales and revenues generated by or associated with specific advertising campaigns can if efficient be used to calculate the actual return on investment (ROI) of campaigns. ROI will thoroughly be explained in the next section.

3.6.1 ROI

ROI is short for return on investment. ROI can be calculated before an investment takes place and if that is the case that forecast can be used to assess if the investment is advantageous or disadvantageous. ROI measurement has been used for centuries and it allows the benefits of projects and programs within organisations to be compared and it also shows the investment needed to achieve a certain benefit (Jack J. Phillipes 2008 p.34, 36).

ROI shows if the money invested is offset by the revenues earned, which is the very least you would expect from an investment.

When ROI is forecasted the formulas used are complex and includes several variables. However, for this study the calculation of the actual ROI and not the forecasted is relevant. Therefore no such formulas will be presented.
When ROI is calculated after an investment, when a project is completed, in such case the ROI indicates the actual outcome of an investment in monetary terms. That information is of true value for managements within organisations since projects and individual performances can be evaluated with help of it. The formula used is very simple. The formula suggested by Rust et.al. (2004, p.7) for calculating ROI looks like this: \( \text{ROI} = \frac{(\Delta CE - E)}{E} \). \( \Delta CE \) is the increase in customer equity which basically means the revenues, and E stands for expenditures associated with gaining those revenues. Therefore: \( \text{ROI} = \frac{(\text{Revenues} - \text{Expenditures})}{\text{Expenditures}} \)

Even though the formula for calculating ROI is simple, it does not mean that it is simple to calculate ROI. The numbers that are put in to the formula is gained by data collection and that data collection is sometimes very hard or even impossible to perform.

### 3.6.2 Calculating advertising ROI

Calculations/estimations of ROI of advertising campaigns can be enabled in different ways. For example, when showing an advertisement campaign of a product through a billboard, exposing a lot of people, you have no realistic possibility of estimating how much revenues that campaign generates. You may have a clue of how many people that gets exposed but you do not know how many people that actually, as a consequence of the exposure, buys the product. One way of solving that problem is to add a code to the content in the advertisement that the consumer has to use when buying the product in order to get a discount. That way the advertiser can gain information regarding revenues generated from a campaign and ROI can be calculated/estimated. When advertising through printed channels, the use of coupons is another method for solving the problem of measuring ROI.

However, only being able to estimate the ROI is not enough for advertisers anymore. Advertisers also want solutions that increase the ROI rates. A system that has had revolutionary effects on advertising is the pay per click (PPC) system. The main purpose of this study is to examine if combining digital signage with mobile advertising enables ROI calculations of digital signage rather than if it increases the rates. However, even though this study is limited to examining how efficient ROI can be measured, ROI rates can possibly also be increased when combining digital signage and mobile advertising. Online advertising platforms have had a huge impact on changing what advertisers’ requires of an advertising platform in general. That includes increasing ROI rates as well as being able to calculate them. Therefore, in order to show that there is a bigger context, it is relevant to explain both how the pay per click system enables ROI calculations and how it increases ROI rates. Nevertheless, whether or whether not combining digital signage and mobile advertising will increase ROI rates will not be examined in this study.

### 3.6.3 PPC

Since 2002, it is possible for advertisers to advertise through search engines and only pay for the advertisements when the advertisement is clicked on to redirect the consumer to the companies’ homepages. This system is called PPC. It has made advertising a lot cheaper and more efficient. The space is auctioned out by the companies providing these platforms. The two leading companies are Google and Yahoo. The auction works as follows: the advertiser can decide themselves how much they want to pay to have their advertisements shown. The more the advertiser is prepared to pay, the higher up on the list will the advertisement be shown when a consumer search for one of the search words the advertiser has chosen to relate its
advertisements to. Regardless of how much or little the advertiser is prepared to pay, they only pay when someone clicks on the advertisement. The auction only settles the order of which the advertisements are shown in the list. (betalaperklick.se, n.d.)

The PPC system makes advertising cost efficient. Advertisements are shown when a consumer search for a word related to the advertisement. Therefore the level of relevance of the content of the advertisement will be high. In addition the advertiser does not have to pay for the advertisement when it is showed, only when a consumer clicks on it in order to get more information. That way the money spent on the advertising is always money spent on exposing consumers that have an interest in the content of the advertisement. Compare that to exposing random people on the street. A lot of the money that are spent on advertising campaigns through billboards is wasted since people that have no interest at all in the advertisements are exposed to them. There is no coincidence that the advertising space on the billboards at time square was extremely hard to sell when the economic crisis first begun. Advertisers are very well aware of the fact that such advertising is inefficient and they are therefore reluctant to spend money on those kinds of campaigns, in particular when the economy is bad but as soon as there are better solutions, they will of course be used in better times as well.

The ROI rates are increased when advertising online thanks to the increased efficiency of the advertising.

Moreover, measuring the ROI of advertising through search engines is simple and free. When advertising through Google for example, a Google ad-words account is first created, that directs the traffic to companies’ homepages. When a purchase (or whatever the goal of directing the traffic to the homepage is) is made on the homepage it is possible to track if the purchase is a result of an advertisement showed through an ad-word campaign. This is called conversion tracking and ROI can be calculated based on it. This service is provided for free by Google. (Google, n.d.B)

### 3.6.4 Push and Pull

Even though advertising through search engines online has a lot of advantages compared to other forms of advertising, one of the main advantages can also be a disadvantage. Consumers are by using the search engine exposed to advertisements that are relevant for them, which increases cost efficiency of advertising for the advertisers and for the consumers it is a convenient way to find what they are looking for. That is of course beneficial both for the consumers and the advertisers. However, it also means that companies are depending on the consumers to first of all go online, and then actively seek for products or services. That kind of “pull approach” to advertising, in most cases, is not enough. Pull advertising means that consumers ask for information rather than a company giving it to them without the consumer asking for it, the latter is commonly referred to as push advertising (Bruner and Kumar 2007, p.4). Companies usually need to apply a push approach, at least as a complement to the pull advertising, a push-pull approach.

Digital signage platforms with an applied feature of SMS-integration such as the SMS-function, i.e. combining digital signage with mobile advertising, are potentially platforms suitable for companies applying a push-pull approach. Why combining digital signage with mobile
advertising creates good features, in what way it is done and how it works on an abstract level will be explained in the following sections.

3.7 Why combining Digital signage and Mobile advertising?

Mobile advertising and digital signage are two individually interesting advertising concepts: however, when combining the two concepts they become even more interesting. The combination was by Nate Nead called “a match made in heaven” (Nead, 2008). Theoretically there is a great potential in the combination having positive effects for advertisers, both regarding digital signage and mobile advertising. For the digital signage, the most beneficial effect is that ROI can be measured and increased. As for the mobile advertising as a concept, combining it with digital signage, gives advertisers a medium to use to reach out to consumers in order to get permission to send promotional offers and advertisements.

As for the ROI measurement of the digital signage which is the focus of this thesis, there are other less complex solutions, without combining digital signage with mobile advertising. For example, a code could be added to the content of a digital signage advertisement which the consumer can bring to a sales place and receive a discount for example. This method is based on the same principles as the SMS-function speaking in terms of linking a purchase to a campaign. However this method requires no interaction from the consumer. From an advertisers point of view this method is therefore less attractive. The ideal is if the consumer when interacting with the digital signage platform through SMS in order to receive a promotional offer also can give permission to the advertiser to send promotions of future campaigns to the consumer’s mobile phone. The SMS-interaction creates a potential to provide consumers with for them attractive promotional offers at more than one occasion. Therefore that solution of measuring ROI of digital signage is more interesting than the example mentioned and other existing solutions for measuring ROI of digital signage.

3.8 Measuring ROI of digital signage by combining digital signage with mobile advertising.

How efficient it is to measure ROI of digital signage when combining digital signage with mobile advertising, is what is to be examined. Previous studies of these two concepts have been focusing on the effects and efficiency of advertising through these channels separately. Showing relevant advertisements is a precondition for the combination of digital signage and mobile advertising to be successful, at least when it comes to measuring the ROI of digital signage advertising. What we know from previous studies discussed in this chapter is that digital signage has in general made outdoor advertising more relevant since it can be adjusted depending on circumstances such as time of day or weather etc. This helps reaching out with the advertising to the right target group of people. Furthermore, we know that mobile advertising needs to be permission based to be successful. This is information that speaks in favour for the combination of digital signage and mobile advertising as a concept. Fig.1 shows the process that leads to the possibility of measuring ROI of digital signage when combining the two concepts.
Parallels can be drawn between the steps in fig.1 and the steps in the AIDA model, which was mentioned in section 3.5. The first step of the AIDA model is “attention”, which in fig.1 is symbolized by the “digital signage”. The purpose of the digital signage is to create awareness and get the consumers attention. The digital signage is push advertising and it ideally stimulates consumers to interact with the signage through SMS. The AIDA models second step “interest” is symbolised by “SMS-interaction” in fig.1, when consumers chooses to interact by SMS, which is done in order to gain promotional offers, it is a clear sign of interest, which in addition is actively shown. That interaction, which is part of the SMS-function, is the link that combines the two concepts digital signage and mobile advertising and gives advertisers permission to send promotional offers to consumers through SMS i.e. permission based mobile advertising. That is pull advertising, and getting promotional offers out to consumers by using digital signage to enable permission based mobile advertising is the kind of push-pull approach to advertising discussed in a previous section.

The AIDA models third step “desire”, is preferably created by the step “permission-based mobile advertising” in fig.1 in which a promotional offer in form of a voucher is sent to a consumer. The AIDA models forth step “action”, is basically the same as the step “consumer action/using the voucher” in fig.1. Consumer takes action as a consequence of the advertising such as purchasing a product and when the action is taken the voucher they have received is used. Fig.1 however also has a fifth step which the AIDA model lacks. The fifth step in fig.1 refers to the possibility of measuring the result of the digital signage advertising and is enabled by the interaction in step two, which allows advertisers to send promotional offers to the consumers’ mobile phones. If an action such as a purchase is taken by a consumer, it is furthermore of particular interest to examine if consumers use the promotional offer or voucher sent to them. The reason is that when these promotional offers are used by consumers the ROI of digital signage can be measured. This since a code has been added to the content of the voucher sent to the consumers. The advertisers can therefore collect statistics themselves at a sales place. The digital signage facilitates mobile advertising which facilitates consumer action and usage of a promotional offer which facilitates ROI measurement of the digital signage. That is how the combination works. Theoretically, the relevance of the advertisements shown through digital signage, gives advertisers the opportunity to measure ROI of a campaign when combining it with mobile advertising. The purpose of this study is to clarify how efficient it works in practice. However, if this method is proven to be successful, it also has limitations. A consumer could buy a product as a result of digital signage advertising without interacting. That would mean that a voucher would not be used and the
revenues could not be linked to a specific campaign. The actual ROI would in such case be higher than the calculated. In addition, a consumer using a voucher could possibly have gone through with a purchase regardless of getting exposed to digital signage advertising and obtaining a voucher or not. In such case the revenues are not directly generated by the advertising. Nevertheless, the measured outcomes are actual revenues associated with a campaign even though it might not be all revenues generated or revenues that could have been gained without the specific advertising campaign in question. It is a way of “earmarking” revenues and by doing that important evaluation of campaigns is enabled.

3.9 Hypotheses

As explained earlier in this chapter digital signage has significantly increased the relevance of the content of advertisements compared to conventional signage. Previous studies on interactive features of advertisements discussed in this chapter did show that the tendency consumers had to interact was low. However, if the relevance of the advertisements is high, the level of interaction is also likely to increase. When consumers are getting exposed to advertisements with a relevant content, it will as showed in fig.1 ideally facilitate interaction through SMS. Therefore:

H₁ Relevant digital signage advertising will stimulate SMS-interaction.

Previous studies referred to in this chapter concludes that advertisers having the consumers permission to send promotional offers to the consumers mobile phone, is a precondition for the successfulness of mobile advertising. If the offer received by the consumer is of interest, the likeliness of the consumer taking an action, such as purchasing a product is presumably high. Important for enabling the ROI measurements is that consumers when taking an action use the promotional offer or voucher that are sent to their mobile phones. Advertising through a digital signage platform with an integrated SMS-function is theoretically a way to reach out to consumers with relevant offers through permission based mobile advertising. When the advertising is permission based and of high relevance, it could be assumed to stimulate consumers to use promotional offers or vouchers that come with the advertising. Therefore:

H₂ Permission based mobile advertising, i.e. promotional offers (vouchers) sent to consumers mobile phones, as a consequence of SMS-interaction with relevant digital signage advertising, will be used if actions such as purchases are taken.
3.10 Research model

Fig. 2 is the research model for this study and shows what is going to be examined.

As can be seen in fig. 2, three different relationships being or not being will be examined. The first one is in fig. 2 illustrated with an arrow that is marked as number “1” between the two circles “digital signage” and “SMS-interaction with the ads?” The question is if consumers when getting exposed to relevant digital signage advertisements that encourage them to send an SMS, i.e. interacting with the digital signage advertisement, in order to gain a promotional offer are stimulated to do so. Relationship 1 is associated with $H_1$. The second relationship to be examined is in fig. 2 illustrated with an arrow marked as number “2” between the two circles “Permission-based mobile advertising” and “Consumer action?” What is going to be investigated is if consumers receiving relevant promotional offers through SMS after requesting them, i.e. permission-based mobile advertising, will be stimulated to use those promotional offers if actions such as purchasing a product or signing up for a subscription etc. is taken. The third relationship to be examined is marked as number “3” in fig. 2, it is illustrated by two arrows connecting the potential relationships 1 and 2. What is to be examined is if there is an association between those two potential relationships. That is, is there an association between consumers...
interacting with relevant digital signage advertisements by SMS in order to receive promotional offers and consumers using the promotional offers when taking actions such as purchasing a product or signing up for a subscription after receiving the offers through permission-based mobile advertising? An association between these two relationships is necessary for being able to measure effectiveness of digital signage advertising. Relationship 2 and 3 are associated with H₂.
Chapter 4 Practical Method

In this chapter data collection and analysis methods, population and sampling will be determined. Furthermore the design and the distribution of the questionnaire will be motivated and in depth explained. The operational definition in addition be clarified and finally the methods for data collection and the collected data will be criticized.

4.1 Data collection

The empirical data in this study has been gathered in accordance with the quantitative research approach that was chosen, which was motivated in chapter two. The data was gathered with help of a self administered questionnaire, which is a questionnaire that respondents answer by themselves. This form of questionnaire can come in several different forms (Bryman 2008, p.216).

In this study the survey was conducted online. Hence, a computerized self administered questionnaire (CSAQ) was used (de Leeuw, Hox and Dillman, 2008, p.264).

This kind of survey can be conducted in different ways. A questionnaire can be attached to an e-mail or an e-mail can contain a link to a webpage, a questionnaire can be on an open website or respondents can be invited to a website to answer a questionnaire etc. (Brace. 2008, p. 31)

Advantages with an online survey compared to an ordinary paper questionnaire is discussed in Brace (2008, p.32). One advantage that is mentioned is that pictures can be used. Another one is that lists of response options can be increased. These advantages are also mentioned in de Leeuw, et.al. (2008, p170-171). Drop down menus are mentioned as an advantageous feature possible to use since it can provide all possible answers to a questions, such as nationality. Graphics, sounds, animation and video, are other possible features mentioned that are possible to add when conducting a survey online but not always when using other formats. In this survey, pictures fulfilled an important function. This will be further explained in section 4.3.5.

4.2.1 Population

A population is in Black (1999, p.111) described as: “..any group that shares a common set of traits...”. The population that was identified for this study was the population of Taipei including suburbs (Taipei County). Taipei city has a population of almost three million people and including suburbs the population is approximately six million people (Taiwan.com.au, n.d.). The choice of population was natural since the research was performed in Taipei. Furthermore, all demographic segments were relevant since general consumer behaviour was measured and not behaviour of a specific demographic segment. An alternative could have been to use National Taiwan University as the population (since the sample was taken from there as explained in the next section) in order to increase the generalizability of the results. However, such a small population including a very homogeneous group of people would not increase the general generalizability of the results of the study. Therefore it was assessed to be unbeneﬁcial to narrow down the population.
4.2.2 Sampling

Sampling is basically always needed to be done when performing research due to lack of resources of different kinds. Selecting a representative sample of the population is important in order to be able to generalize findings to the population. (Bryman, 2008, p.167-168) For this study convenience sampling was chosen.

Convenience sampling is, as revealed by the name, a sampling method that when being used, the researcher selects a sample that is convenient to reach. Unfortunately this also means that the sample might be highly unrepresentative. (Black 1999, p.125)

There are other sampling methods that for sure would have been more appropriate to use in order to being able to generalize the findings. However, primary due to linguistic but also practical issues, convenience sampling was in the end the only optional sampling method to apply. Performing some kind of random sampling of the population would have required a lot of communicating in Chinese. This issue was assessed to be too hard to handle without involving external actors to an unreasonable extent. Furthermore, it would have been too time consuming and probably also too expensive for this project. Since the relatively ease to reach, it was decided that the sample should consist of students.

The sample consisted of some of the students studying at National Taiwan University (NTU), Taipei, Taiwan. NTU has approximately 30 000 students. It has several different colleges and the sample in this study consists of the students at the college of management at NTU. The college of management has approximately 2000 students and that was therefore also the sample size.

4.3.1 Construction of the questionnaire

The questionnaire was constructed so that it consisted of three parts. Furthermore the language used when constructing the questionnaire was English: however the version that was distributed was translated to Chinese. The English version of the questionnaire can be found in appendix 1 and the Chinese version can be found in appendix 2.

In the following sections, information regarding the general design and the translation of the questionnaire will be provided. It is followed by detailed information regarding the construction of the three parts.

4.3.2 General design

When designing the questionnaire a main goal was to keep it as short as possible. This factor together with clear instructions and an attractive layout is features of a questionnaire that increases response rates. (Bryman, 2008, p.221) These factors were all taken into consideration when designing the questionnaire.

The main questionnaire (part 2 and 3), was designed to consist of only closed questions. The reason was to ease the data analysis (Bryman, 2008, p.235). In the first part there is only one
open question, it regards the respondents age and was therefore easy to analyze despite being open.

The fixed answers were mainly organized horizontally. Only the fixed answers of the first part were vertically organized. According to Bryman (2008, p.222) the vertical format is preferred by many researchers, mainly because the horizontal format can lead to confusion. Attention was therefore paid to make sure that the horizontal fixed answers were organized in a non-confusing way.

In the main part of the questionnaire vignette questions were used. Vignette questions presents a scenario or a statement to the respondent, which for example can answer by indicating its attitudes on an item ranging from strongly agree to strongly disagree. Vignette questions can reduce unreflective answers. (Bryman, 2008, p.245-247)

The respondents had in the main part of the questionnaire the possibility of not actually taking a standpoint, since all fixed answer items included a “middle option”. It is debated if this is good or not. In Bryman (2008, p.244), a reason for including a middle option is said to be to avoid forcing the respondents to express opinions that they do not really have. In contrast, it is said that by including it, respondents might out of laziness chose that answer alternative in order to not having to reflect over the issue in question, especially late in the questionnaire.

Not including a middle option was assessed to limit respondents possibilities of accurately answer the questions and it was therefore included. The questionnaire was kept short in order to as much as possible prevent respondents from getting bored and thereby not answering in accordance with their real attitudes or opinions.

4.3.3 Part 1

The first part of the questionnaire includes classification and screening questions.

Classification questions are questions that regards gender, age, level of education, income etc. These questions can sometimes be intrusive and it could therefore be a point to put them in the end of the questionnaire. (Brace, 2008, p.44) However, the classification questions included in this questionnaire was not assessed to be of the intrusive kind, both because of the questions characteristics and because the questionnaire was self administered and anonymous. These questions were therefore placed in the beginning of the questionnaire. Question 1 and 2 are classification questions and they ask about age and gender of the respondent. The questions were included in order to enable analyses regarding these factors impact on consumers’ tendency to interact with digital signage advertisements and in cases such interaction occurred, enable analyses of the factors impact on consumers’ tendency to take actions such as a purchase after stimulation of permission based mobile advertising.

Screening questions are used to make sure that the respondents belong to the population and sample that has been selected (Brace, 2008, p.38) Two screening questions were used in this questionnaire, question 3 and 4. The purpose of them was to make sure that the respondent was a student at college of management of National Taiwan University which was the sample selected, and to make sure that the respondent was an inhabitant of Taipei/Taipei County since that was the selected population.
4.3.4 Part 2

The second and third part constitutes the main questionnaire. In the main questionnaire, more general questions are normally asked first and more specific questions later. This in order to avoid different kinds of bias associated with the researcher asking specific questions first and by doing that revealing its interests. It could in that case affect respondents’ answers in more general questions. Among the general questions, behavioural questions should be asked before attitude questions. It is considered to be more appropriate to first let the respondent show behavioural standpoints which will then be explained by attitudes. Behavioural questions are in addition normally easier to answer. (Brace, 2008, p.40-42) The second part of the questionnaire, question 5-13, consists of three categories of general questions. The first category is a category of behavioural questions that regards involvement in sales promotional deals. The two following categories includes attitude questions and are in accordance with Brace (2008) placed after the behavioural questions. The questions in the two categories regard attitudes towards advertising and attitudes towards mobile advertising. All three categories of questions were included in the questionnaire because they were believed to be factors that could possibly influence consumers’ interaction with digital signage advertisements and actions taken after such interaction.

In order to make sure that the questions were well formulated, questions that had been used before were used. This is in accordance with Bryman (2008, p.248). The questions regarding involvement in sales promotional deals were found in Bruner, Hensel and James (2001, p.344-345). The original set of questions consisted of eight questions. That was considered to be unnecessary many for this study since only general knowledge of the respondents’ behaviour was needed. Furthermore, it would make the total questionnaire too long to include all of them. Hence, three questions appropriate for indicating the respondents’ behaviour were selected.

The questions regarding attitudes toward advertising were found in Bruner Hensel and James (2005, p.686). This set of questions was used in its original shape since no need for modifications was found.

The questions regarding attitudes toward mobile advertising were found in Bruner et.al. (2005, p.750). The set originally consisted of five questions but was shortened down to three. Since the aim with using this set of questions only was to determine if the respondents attitudes towards mobile advertising is positive, negative or somewhere in between, the three questions that were used was assessed to provide sufficient information. Furthermore the original set of questions was aimed to be used to measure attitudes toward web advertising. The set of questions was however assessed to be suitable for measuring attitudes towards mobile advertising as well. “Web advertising”, that were used in the original formulations of the questions were replaced with “Mobile advertising”.

Within the three sets of questions, there are questions that can reveal if a respondent is affected by a response set. The questions are formulated as a statement and the respondent is asked to indicate its level of agreement on a scale ranging from “strongly agree” to “strongly disagree”. A respondent that is affected by a response set could for example be strongly agreeing to all statements even though doing so would result in conflicting answers (Bryman, 2008, p.223-224). Accordingly, by indicating the same level of agreement to the statements within the three sets of questions in the questionnaire, a respondent would be leaving conflicting answers and the answers should therefore be considered to be biased. In particular, respondents answers to
question 12 and 13 was used to look for respondents affected by a response set, by answering that agreeing to any degree to both statements, the answers would be conflicting.

4.3.5 Part 3

Part three of the questionnaire is first describing a scenario and questions regarding the scenario follow afterwards. These questions (question 14-25), are key-questions for this study and of the specific kind. They are therefore, in accordance with Brace (2008, p.40-42), placed in the end of the questionnaire.

The respondents were asked to imagine a specific scenario which is described. The scenario describes how the respondents when sitting in a taxi car get exposed to digital signage advertising. The advertisement showed is for a hotel. Furthermore, the respondents can by sending an SMS to a number displayed in the advertisement receive an automatic reply with a voucher entitling the respondents to a discount of X%, when spending a night at the hotel. The respondents will need to show the voucher to the staff at the hotel in order to get the discount. The advertisement that is shown is relevant for the respondents since it is for a hotel that the respondents already have decided to spend one night in. It is emphasized that the respondents already has decided to spend a night at that specific hotel to make clear that the decision does not regard a hotel in general. This was done in order to rule out considerations regarding prices and personal preferences etc. as factors affecting the respondents’ answers.

Three pictures were used to make the scenario easier to grasp for the respondents. In the first picture the respondents could see the backseat of a taxi car with a screen, used for digital signage and displaying contents, installed. The second picture showed a picture of the screens menu on which different contents could be chosen and the third picture showed the screen when the advertisement the respondents had the possibility to interact with was displayed, together with other content. As mentioned in section 4.1, the possibility of using pictures is one of the advantages with online surveys. However, in de Leeuw et.al. (2008, p.171), it is stated that pictures when being used in a questionnaire can bias the answers. However, these pictures were used in order to visualize the scenario described and was assessed to have an effect of increasing clarity rather than creating confusion. The imaginary scenario was important to make the respondents understand under what preconditions the questions should be answered. The aim with using the pictures was to increase the clarity of these preconditions.

The most important information in the scenario is: that the respondents already has decided to spend a night at the hotel, that an SMS needs to be sent in order to get the voucher and that the voucher needs to be showed to the staff if the discount shall be obtained. This information was due to its importance highlighted by bolding the text, in order to clearly emphasise it.

It could be questioned if the scenario described is realistic for the sample of respondents selected. If it would be considered as an unrealistic scenario by the respondents, it could potentially affect the credibility of the responses. Students might be believed not to spend a night at a hotel very often due to economical reasons. Furthermore it could be questioned if they really would spend a night at a hotel in the same city as they live in, which is what the scenario describes.

Regardless of what kind of scenario that would have been described, it is impossible to make it realistic for all respondents. This is due to individual perceptions and preferences. The focus was
therefore on making the instructions clear rather than on trying to find a scenario that all respondents could perceive as realistic. With that said, it should be clarified that spending a night at a hotel in the same city as they live in, is for most students included in the sample a very realistic scenario. This is associated with the conservativeness of the Taiwanese culture. Most students in the sample live in dorms on campus. There are separate male and female dorms and access to the opposite genders dorm is strictly forbidden. Therefore: if students want to spend the night with a boy/girlfriend, renting a room at a hotel is very common. In addition, students that live outside of campus usually live at home with their parents. Those students are basically in the same situation as the students living in a dorm, again due to the conservativeness of the culture. Therefore the culture does impact the frequency of hotel visits among the students included in the sample.

The questions that follows after the scenario, asks, given the already described scenario, if the respondent would send the SMS in order to receive a voucher, entitling the respondent to a discount, and if that voucher would be used. These are the questions that ultimately were used to measure if digital signage advertising and mobile advertising as a combination enables ROI calculations of digital signage advertising.

In the questions, two different options regarding the discount rate that can be gained is given: 5% and 15%. Furthermore three different options regarding the time for the hotel stay is given in the questions: tonight, in one week and in one month. Together that gives six combinations of discount rate and time for the hotel stay that the respondent is asked to consider when being asked if they would send the SMS and if the voucher received in that case, would be used. The reason for the different options are that even though a advertisement is relevant or interesting for the consumer getting exposed to it, there are different degrees of relevance. Through the scenario it is made clear that the advertisement is relevant for the respondent and by taking the discount rate and time factor into consideration, the degree of relevance is made flexible. The importance of the advertisements degree of relevance for stimulating interaction with the digital signage advertisement and usage of the voucher was thereby made possible to analyze.

I consider an advertisement through which the discount rate possible to gain is 15% as more relevant than one through which the possible gain is a 5% discount. Furthermore, in terms of when the intention is to stay at the hotel, I consider an advertisement to be more relevant the closer into the future the intended stay will take place. This is not as obvious as in the case of the discount rate: however, if the intended stay at the hotel is in a far away future, I believe that a consumer might not have the same interest in requesting a voucher right now. The voucher could get hold of later, it can be forgotten and so on.

The scale used in the questions of the third part of the questionnaire, was found in Bruner and Hensel, (1998, p.103) and was created to measure attitudes towards a product idea. The original was modified to fit the needs in this specific case. Formulations in the scale were changed and only one of the original scales four items was used.

4.4.1 Translating the questionnaire

Since the questionnaire was sent to a sample of mainly Taiwanese students, it was necessary to translate it to Chinese in order to obtain the best results. The translation was done with help of native Chinese speakers with good English skills. After the questionnaire had been translated, the
Chinese version and the English version were showed to representatives of the office of international affairs at National Taiwan University. Furthermore it was showed to a professor at National Taiwan University that teach classes in English. It was done to confirm that both versions communicated the same message to the respondents. Necessary changes were made.

4.4.2 Testing the questionnaire

It is impossible to write a perfect questionnaire without testing it. Attitudes and experiences of respondents effects their way of interpreting questions, and if the questionnaire is not tested it cannot be assured that respondents interpret questions the way the researcher has intended. (de Leeuw et.al. 2008, p.176)

The questionnaire was tested by asking seven people with Chinese as their native language to read it. Their general reflections were then considered and follow up questions were asked. In general, the result of the pilot study showed that the questionnaire was clear in its instructions and layout. Furthermore it was not perceived to be too long. As a result of the pilot study minor changes were made in order to increase the clarity and prevent misunderstandings.

4.4.3 Distribution of the questionnaire

The questionnaire was distributed by e-mail. An e-mail was sent to a representative at College of management at National Taiwan University, with access to e-mail addresses to all the students at the College of management. The representative then forwarded the e-mail to the students. The e-mail contained a letter asking the receiver to participate in the survey and it explained the purpose of the survey as well as including the approximate time it would take to answer the questionnaire. In addition, the e-mail contained a link that the receiver was asked to click on, alternatively copy and paste it in the web browser, in order to get directed to the survey webpage. The covering letter can be found in both an English and Chinese version in Appendix 3.

4.5 Data analysis

The webpage, on which the survey was conducted constituted a platform for the survey, the empirical data collected on the webpage were then statistically analyzed in SPSS. When analyzing the data, emphasis was put on examining existing or non-existing relationships showing that ROI of digital signage can effectively be calculated when being combined with mobile advertising through the SMS-function. This was done with help of descriptive statistics.

4.6 Operational definition

Operational definition is by Herzog (1996, p.18) explained as a detailed way to describe how research has been done, other researchers should be able to do it the same way and get the same result. An example of a definition of the concept is: “An operational definition describes a set of procedures a researcher can follow in order to establish the existence of the phenomenon described by a concept” (Frankfort-Nachmias, Nachmias, 2005, p.32). The operational definition for this study is determined in this chapter as well as in previous chapters. In this section particularly important issues that have been mentioned in the previous chapters and have a major
impact on the characteristics of the operational definition of this study will be elaborated on. Those are: the relevance of the digital signage advertising which respondents in this survey are asked to presume that they get exposed to, and the purchase intent the respondents are asked to presume that they have of the service in question in the questionnaire.

Pinpoint Media’s solution is as already mentioned an innovative form of digital signage platform and has features that all digital signage platforms do not have. Particularly features that are associated with reaching out to the right target group of people with an advertisement. However, those features can be overlooked when speaking in terms of the platform being representative for digital signage platforms in general. This since it in this study, when the tendency to interact with an advertisement through a mobile phone was measured, it was presumed that the advertisement that the consumer got exposed to contained relevant information. This was done by, in the scenario described in the questionnaire, asking respondents to presume that they already before getting exposed to advertising had an intent to spend a night at the hotel which the advertising regarded. Thereby it was assumed that the respondents had a purchase intention. In other words, the tendency consumers had to interact when getting exposed to a highly relevant advertisement was measured and not the general tendency to interact when getting exposed to advertising. Obviously all advertisements shown through a digital signage platform, regardless of how effective the advertising is, will not be relevant. However, this study focuses only on how to measure effectiveness of advertising, speaking in terms of economical outcomes, and not on how to reach out to a target group of people. For the sake of evaluating the effectiveness of the method that was tested, it was necessary to presume that the consumers got exposed to relevant advertisements. This because consumers exposed to irrelevant advertising presumably has no tendency to interact.

This relevance could be obtained without having the consumers presuming a purchase intention. However, in order to secure that respondents whom are stimulated by digital signage advertising to request a voucher by interacting through SMS also would consider if they would use the voucher, the presumed purchase intent plays an important role. If the purchase intent would not have been presumed, it is possible that respondents answering that they would interact would answer that they would not use the voucher for reasons associated with not buying the product/service. What is interesting for this study to examine is if respondents that actually do buy the product/service in question use the voucher, not if the product/service is bought. The presumed purchase intent is therefore necessary.

4.7 Criticism against collected data and data collection method

In this section sampling errors, non-sampling errors, data collection errors and data processing errors associated with this study will be discussed.

Sampling errors are basically errors that occur as a consequence of the sample selected not being representative for the population (Bryman, 2008, p.188). In this study the choice of sampling method is one source that creates a sampling error. Convenience sampling was used and that can produce a highly unrepresentative sample (Black, 1999, p. 125). The particular characteristics of the sample used for this study, causes it to be un-representative.
Non-sampling errors are when differences between the population and sample occurs as a consequence of an insufficient sampling approach or due to non-response (Bryman and Bell, 2007, p. 182).

The sample consisted of approximately 2000 students and the number of gathered observations was 106. Of those, 95 could be used which gives a response rate of less than 5%. This low rate was expected. As already mentioned, the characteristics of the sample used, is of such kind that the representativeness is very low. The low response rate is therefore not assessed to further affect the representativeness of the sample.

Of the 11 observations that were excluded from the analysis, 9 observations were excluded because of incomplete answers. One observation was included despite the questionnaire not being completed. In the particular questionnaire, an answer regarding the respondent being a student at NTU or not was missing. However, since the questionnaire was distributed only to students having a NTU student e-mail, the observation was included since the likeliness of the respondent not being a NTU student, and thereby not being part of the sample, is very small. Moreover, two observations were excluded due to contradictory answers in question 12 and 13.

When the data had been collected, it was discovered that only 75/95 of the respondents, actually lived in Taipei/Taipei county, which is the population. The 20 respondents not living in Taipei/Taipei county was despite this included in the statistical analysis. They all answered that they are students at National Taiwan University so the likeliness that these respondents do spend a lot of time in Taipei is high. In addition, considering the characteristics of the sample that was used, the sample will never be very representative and generalisations will never be possible to do. This is something that has to be considered when looking at the final results of this study. By excluding respondents not living in Taipei/Taipei county the total number of observations would decrease significantly. Therefore it was assessed that such exclusion would make the sample even less representative. The respondents were therefore included in the sample. This is however a non-sampling error that occurred.

Data collection errors, refers to errors associated with the design of the questionnaire etc. Data processing errors refer to errors associated with how data has been analyzed (Bryman and Bell, 2007, p.204).

These two types of errors has been reduced to as great extent as possible by how the questionnaire was designed for example. Furthermore, errors when processing the data have been avoided to as great extent as possible by doing the analysis in SPSS. The computerized part of the analysis could be presumed to be free from errors. However, the data input was done manually and re-coding was as well. Errors could have been made even though great effort was put into avoiding it.
Chapter 5 Empirical data

In this chapter the empirical data that has been gathered will be presented. This will be done with help of Pie charts, histograms line charts crosstabs and tables.

5.1 General questions

The result of the general questions asked is shown in this section. In total, 95 answered questionnaires were used for doing the statistical analysis. 66 (69.5%) were answered by females, which is the green field in Fig.3 and 29 (30.5%) by males, which is the blue field in Fig.3. The frequency of male respondents was very low. The number of males responding was assessed to be insufficiently low to use for any analysis by itself. Consequently no relevant comparisons between males and females were assessed to be possible to perform.

In Fig.4 the age distribution among the respondents can be seen. The age ranges from 18-40 and more than 90% between 19-29 years old. This is logical since the sample consisted only of students. The large concentration of respondents between 19 and 29 made analyzing the impact of age in general less interesting and was such analysis was therefore not performed.

In addition, 94 of the respondents answered that they are a student of college of management at National Taiwan University. One respondent did not answer the question but was included anyway for reasons explained in section 4.7. Moreover, the general questions showed that 75/95 of the respondents lived in Taipei/Taipei county. All of these respondents were included in the analysis, also for reasons explained in section 4.7.
5.2 Behavioral and attitude questions

Three sets of behavioural and attitude questions were asked in the questionnaire. Each set consisted of three questions. The answers to the questions were re-coded into a 1-5 scale, in which 1 reflects a very negative attitude/very low involvement, 3 a neutral attitude/involvement and 5 a very positive attitude/very high involvement. In order to get an overall picture of respondents answers, an average of each respondents answer to the three questions within each set of questions was then calculated. The result is shown in histograms below.

In Fig.5 the respondents’ involvement in sales promotions are shown. As can be seen, the mean is 3.64 and the standard deviation is 0.721. This indicates slightly positive involvement and a low variability. The mean is the sum of all scores divided by the number of scores (Morgan et.al.2007, p.46). The standard deviation is a measure of variability, and basically shows the spread of answers from the mean (Morgan et.al.2007, p.47). About 18% of the answers are found between 2 and 2.67 on the scale, which reflects a low involvement. 8.5% are completely neutral and almost 75% answered between 3.33 and 5 on the scale. However, 25% answered somewhere between 3 and 4 on the scale, which reflects an involvement slightly higher than neutral. The remaining 50% of the respondents indicates a high to very high involvement. These numbers shows that the general involvement in sales promotions among the respondents is quite high.

In Fig.6 attitudes towards advertising are shown. The mean is 3.24 and the standard deviation 0.554, which reflect a slightly positive attitude in general among respondents and a low variability. About 29% answered between 2 and 2.67 on the scale, reflecting a negative attitude towards advertising. Almost 15% has answered that their attitude is completely neutral and about 57% of the answers are found between 3.33 and 4.33, which reflects a slightly positive to positive attitude. Worth mentioning is that almost 40% of the answers are between 3.33 and 3.67, reflecting a slightly positive attitude. Accordingly, a clear majority of the ones with a to some degree positive attitude, only have a slightly positive attitude.
In Fig. 7 attitudes towards mobile advertising are shown. The mean is 1.95 and the standard deviation is 0.722, indicating a general negative attitude and a low variability. 86% answered between 1 and 2.67 on the scale, which reflects a slightly negative to very negative attitude. Approximately 20% has a slightly negative attitude and more than 65% have a negative to very negative attitude. Only around 5% has indicated that they have a positive attitude towards mobile advertising.

Fig. 6-Attitudes towards advertising

To summarize: the findings in this section, shows that the general attitudes towards advertising are slightly positive. Furthermore, the respondents in general have a quite high involvement in sales promotions. However the attitudes towards mobile advertising are clearly negative.
5.3.1 Specific questions

Question 14-25 were questions of specific kind. Those were the questions regarding if respondents would send an SMS, when encouraged to, in order to get a voucher and if the voucher would also be used. In this section the result of the specific questions will be shown with help of crosstabs, phi, line chart and histograms.

5.3.2 Crosstabs and Phi

Phi provides information regarding the strength of the association between two variables. The value can range between -1 to 1 and a value close to -1 or 1 indicates that there is a strong relationship and a value close to zero indicates that there is no relationship. (Morgan et.al. 2007, p. 103).

A phi value of 0.1 indicates a small association, a value of 0.3 a medium association and a value of 0.5 a large association (Stern, 2008, p. 193). Furthermore, in terms of frequency, it is easy to see in the crosstabs that comes with the phi calculations, how many respondents that would send the SMS, how many that would use the voucher and how many that would do both.

The answers from the questionnaire were re-coded into yes and no/no comment variables. The ones who answered between 1 and 4 on the original scale were re-coded into a yes category and the rest into a no/no comment category. The results are shown below.

Table 1 shows respondents answers regarding sending the SMS and using the voucher when the discount rate is 15% and time for usage of the voucher (time for the hotel stay in the scenario described in the questionnaire) is today/tonight. It shows that 83/95 or 87% would send the SMS in order to gain the voucher and of those, 81/83 or 98% would use the voucher. Therefore, 81/95 or 85% would both send the SMS and use the voucher.

<table>
<thead>
<tr>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phi</td>
<td>.422</td>
</tr>
<tr>
<td>Nominal by Nominal</td>
<td>.000</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use 15% Today</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No, No comment</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Send 15% Yes</td>
<td>81</td>
</tr>
<tr>
<td>Send 15% No, No comment</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
</tr>
</tbody>
</table>

The phi value is .422 and the significance value is .001, which indicates a rather large association between the variables and that the test is statistically significant. A significance value of .05 or less shows, that the result is statistically significant (Morgan et.al. 2007, p.92). The significance value is in Table 1 shown as .000, however all significance values under .001 is by SPSS showed as .000 and since the significance is unlikely to be zero, it should be interpreted as .001 (Morgan et.al. 2007, p. 107)
Considering the large number of respondents of whom answering yes to sending the SMS, that also answered yes to using the voucher, the association between the variables, i.e. the phi value, could be expected to be higher. However, the relationship between the ones answering no/no comment to both questions is not proportioned in the same way as the ones answering yes. That might be a likely explanation to why phi is relatively low. Furthermore, phi is a kind of chi square test, and if any of the four frequency values in a 2x2 table is less than 5, the value obtained can be unreliable (Morgan et.al. 2007, p.104). In Table 1, two of the cells in the 2x2 table include frequencies less than 5. Since it for this study only is interesting to analyze the association between the ones answering yes to sending the SMS and the ones answering yes to using the voucher, the phi value is of less importance. The phi value should only be considered as a support to the relative frequencies and percentage frequencies, which will be given the greatest attention in this analysis.

Table 2 shows the results when the discount rate is 5% and the time for using the voucher is today/tonight. It shows that 65/95 or 68% would send the SMS, and of those, 63/65 or 97% would use the voucher. Therefore 63/95 or 66% both send the SMS and use the voucher. The phi value is .541 and the significance value is .001, indicating a large relationship between the variables and that the test is statistically significant.

Table 3 shows the results when the discount rate is 15% and the time for using the voucher is in one week. 83/95 or 87% would send the SMS, and of those, 81/83 or 98% would use the voucher. Therefore 81/95 or 85% would both send the SMS and use the voucher. The phi value is .336 and the significance value is .001, indicating a medium association between the variables and that the test is statistically significant.
Table 3- Send 15% One week * Use 15% One week

<table>
<thead>
<tr>
<th>Crosstabulation</th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal Phi</td>
<td>.336</td>
<td>.001</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>95</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use 15% One week</th>
<th>yes</th>
<th>No.No comment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send 15% One week</td>
<td>81</td>
<td>2</td>
<td>83</td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>5</td>
<td>95</td>
</tr>
</tbody>
</table>

Table 4 shows the result when the discount rate is 5% and the time for using the voucher is in one week. It shows that 76/95 or 80% would send the SMS, and of those, 70/76 or 92% would use the voucher. Therefore 70/95 or 74% would both send the SMS and use the voucher. The phi value is .522 and the significance value is .001, indicating a large association between the variables and that the test is statistically significant.

Table 4- Send 5% One week * Use 5% One week

<table>
<thead>
<tr>
<th>Crosstabulation</th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal Phi</td>
<td>.522</td>
<td>.000</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>95</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use 5% One week</th>
<th>yes</th>
<th>No.No comment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send 5% One week</td>
<td>70</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>17</td>
<td>95</td>
</tr>
</tbody>
</table>

Table 5 shows the results when the discount rate is 15% and the time for using the voucher is
in one month. It shows that 86/95 91% would send the SMS, and of those, 84/86 or 98% would use the voucher. Therefore 84/95 or 88% would both send the SMS and use the voucher. The phi value is .290 and the significance value is .005, indicating a medium association between the variables and that the test is statistically significant.

Table 5- Send 15% One month * Use 15% One month
Crosstabulation

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal Phi</td>
<td>.290</td>
<td>.005</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td></td>
<td>95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use 15% One month</th>
<th>Yes</th>
<th>No/No comment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send 15% One month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>84</td>
<td>2</td>
<td>86</td>
</tr>
<tr>
<td>No/No comment</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>4</td>
<td>95</td>
</tr>
</tbody>
</table>

Table 6 shows the results when the discount rate is 5% and the time for using the voucher is in one month. It shows that 77/95 or 81% would send the SMS, and of those, 75/77 or 97% would use the voucher. Therefore 75/95 or 79% would both send the SMS and use the voucher. The phi value is .625 and the significance value is .001, indicating a large association between the variables and that the test is statistically significant.

Table 6- Send 5% One month * Use 5% One month
Crosstabulation

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal Phi</td>
<td>.625</td>
<td>.000</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td></td>
<td>95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use 5% One month</th>
<th>Yes</th>
<th>No/No comment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send 5% One month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>75</td>
<td>2</td>
<td>77</td>
</tr>
<tr>
<td>No/No comment</td>
<td>8</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>12</td>
<td>95</td>
</tr>
</tbody>
</table>
5.3.3 Table and Line chart summarization of crosstabs

Table 7 and Fig.8 summarizes the information given in table 1-6 regarding respondents that would send the SMS and respondents that would both send the SMS and use the voucher, in terms of relative frequency and percentage frequency.

Column 2-7 in Table 7 includes the different discount rates in the voucher and the time for using the voucher can be seen, column 8 is an average column. Row 2 and 3 divides responses into respondents that would send the SMS and respondents that would both send the SMS and use the voucher and the fourth row shows the association between respondents that would send the SMS and use the voucher. In general, the frequencies for sending the SMS and both sending the SMS and using the voucher are high. It ranges from 63/95 or 66% (would send the SMS and use the voucher when the discount rate is 5% and the time for using the voucher is today) to 86/95 or 91% (would send the SMS if the discount rate is 15% and the time for using the voucher is in one moth).

<table>
<thead>
<tr>
<th></th>
<th>15%Today</th>
<th>5%Today</th>
<th>15%One week</th>
<th>5%One week</th>
<th>15%One month</th>
<th>5%One month</th>
<th>Average%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would send the SMS</td>
<td>83/95 (87%)</td>
<td>65/95 (68%)</td>
<td>83/95 (87%)</td>
<td>76/95 (80%)</td>
<td>86/95 (91%)</td>
<td>77/95 (81%)</td>
<td>82.3%</td>
</tr>
<tr>
<td>Would send the SMS and use the voucher</td>
<td>81/95 (85%)</td>
<td>63/95 (66%)</td>
<td>81/95 (85%)</td>
<td>70/95 (74%)</td>
<td>84/95 (88%)</td>
<td>75/95 (79%)</td>
<td>79.5%</td>
</tr>
<tr>
<td>Association between respondents that would send the SMS and use the voucher</td>
<td>81/83 (98%)</td>
<td>63/65 (97%)</td>
<td>81/83 (97%)</td>
<td>70/76 (92%)</td>
<td>84/86 (98%)</td>
<td>75/77 (97%)</td>
<td>96.5%</td>
</tr>
</tbody>
</table>

On average, 82.3% of respondents would send the SMS and 79.5% would both send the SMS and use the voucher. The association between respondents that would send the SMS and use the voucher is very strong. On average, 96.5% of the respondents that answered that they would send the SMS also answered that they would use the voucher.

Fig.8 has relative frequency on the vertical axis, and percentage rate of discount in the voucher and time for usage on the horizontal axis.

In general the two lines “Send” and “Send and Use” in Fig.8, graphically shows what was stated earlier in this section, namely that, in general, the frequencies for sending the SMS and both sending the SMS and using the voucher are all high. Furthermore, the red line “Send” and the blue line “Send and Use” are almost identical, which shows the strong association between respondents that would send the SMS and use the voucher.
Most interesting with Fig.8 is that it clearly reveals the impact the discount rate have on the frequency with which respondents would send the SMS and use the voucher. It is easy to see that for both lines, the frequency is higher when the discount rate is 15% compared to when it is 5%. However, the time for usage of the voucher, seems to have less impact, especially when the discount rate is 15%.

Table 8 shows the average percentage frequency of respondents sending and both sending and using the voucher depending on the discount rate in the voucher, and depending on the time for usage of the voucher.

**Table 8-Send and Send and Use average depending on discount rate and time for usage**

<table>
<thead>
<tr>
<th></th>
<th>15%</th>
<th>5%</th>
<th>Today</th>
<th>One week</th>
<th>One month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send (average %)</td>
<td>88.3%</td>
<td>76.3%</td>
<td>77.5%</td>
<td>83.5%</td>
<td>86%</td>
</tr>
<tr>
<td>Send and Use (average %)</td>
<td>86%</td>
<td>73%</td>
<td>75.5%</td>
<td>79.5%</td>
<td>83.5%</td>
</tr>
</tbody>
</table>

Row 2 and 3 in Table 8 shows the average percentage frequency of respondents that would send the SMS and both send the SMS and use the voucher, depending on discount rate in the voucher and time for using the voucher. Row two, which regards respondents that would send the SMS, shows that the average percentage frequency is 12% higher when the discount rate is 15% compared to when it is 5%. Row three, which regards respondents that would both send the SMS and use the voucher, shows that the percentage frequency is 13% higher when the discount rate is 15% compared to when it is 5%. Accordingly, the discount rate in the voucher do have a significant impact on respondents tendency to send the SMS and both Sending the SMS and using the voucher. Even though the frequencies associated with a 15% discount is significantly higher than the frequencies associated with a 5% discount, the average frequencies of
respondents sending the SMS and both sending the SMS and using the voucher, are high when the discount rate is 5%, 76.3% and 73% respectively.

On row two and three in Table 8, it can also be seen that the average frequencies for sending the SMS and both sending the SMS and using the voucher, tend to get higher the longer into the future the time for using the voucher is.

However, Fig.8 and Table 7 shows that this relationship is basically only valid for sending the SMS and both sending the SMS and using the voucher when the discount rate is 5%. When the discount rate is 5%, the frequency clearly tends to increase the longer into the future the time for using the voucher is. However, when the discount rate is 15%, the frequency levels are relatively stable.

Furthermore, the difference in average frequency is not as significant as the difference regarding the percentage rates. Between sending the SMS if the time for usage is today compared to in one month, the average difference in frequency is 8.5% and for both sending the SMS and using the voucher the difference is 8%. Whether this relationship is coincidental or if the time for usage factor actually has this impact on respondents’ tendency to send the SMS when the discount rate is 5% but not when it is 15%, is hard to tell. What is most interesting regarding the results associated with the time for usage factor for this study, is that respondents not tend to send the SMS and both Send the SMS and use the voucher with a higher frequency the closer in the future the time for usage is. This will be further discussed in the next chapter. The relationship will therefore not serve as foundation for any conclusions.
5.3.4 Histograms of distribution along the “yes-scale”

As mentioned in the previous chapter, the scale used in the questionnaire in question 14-25 ranged from -4 (I would definitely not send/use the SMS/voucher) to 4 (I would definitely send/use the SMS/voucher). A non stand point option (zero) was included. In the two previous sections, all respondents answering 1-4 to the questions in the questionnaire were analyzed as a “yes-group”. However, it is also interesting to look at the distribution along the “yes-scale”.

In fig.9, 10 and 11, the distribution along the yes-scale is shown for responses regarding sending the SMS when the discount is 15% and for all three options regarding time for usage of the voucher.

Fig.9 regards sending the SMS when the discount is 15% and the time for using the voucher is today/tonight. As can be seen in the histogram, most respondents answered 3 and 4, namely 80%.

Fig.10 regards sending the SMS when the discount rate is 15% and time for usage is in one week. Also here most respondents indicated either 3 or 4, in precise 81%.

Fig.11 regards sending the SMS when the discount is 15% and the time for using the voucher is in one month. 79% answered 3 or 4.

Fig.9, 10 and 11 shows that around 80% of the ones answering yes to sending the SMS when the discount rate was 15%, answered yes in a strong manner.
Fig. 12, 13 and 14 shows the distribution of the answers along the yes-scale when the discount is 5% and for all three time options. The answers in the three histograms are quite evenly distributed along the scale. This is an interesting difference compared to when the discount rate is 15%.

Furthermore, the distribution of answers along the yes-scale seems to be unaffected by time for usage of the voucher in Fig. 9-14.

When looking at the distribution along the scale for using the voucher, the proportions are similar to the ones in fig. 9, 10 and 11 regardless of discount rate. In other words, around 80% answered 3 or 4. The histograms can be found in Appendix 4. Respondents answering that they would use the voucher, do so in a strong manner regardless of time for usage and discount rate.

To summarize this section: The distribution of answers along the yes-scale for the questions regarding sending the SMS, looks different when the discount rate is 15% compared to when it is 5%. Respondents tend to answer yes in a stronger manner when the discount rate is 15%. No such relationship is found for the different times for usage of the voucher. The distribution along the yes-scale for questions regarding using the voucher is not affected by the discount rate nor time for usage.
Chapter 6 Discussion

In this section the results of the empirical data collected will be discussed. The hypothesis will be accepted/rejected. In addition, relevant findings not directly associated with the hypotheses will be discussed.

6.1 Hypothesis 1

In chapter three it was hypothesized that: “H1 Relevant digital signage advertising will stimulate SMS-interaction.”, which in this study, practically refers to sending a SMS when being encourage to by getting exposed to a digital signage advertisement. Sending a SMS would be done in order to gain a voucher entitling the owner to a discount. A situation in which respondents experienced such encouragement was simulated by the scenario that was explained in the questionnaire. The respondents were asked if they would send a SMS presuming different discount rates in the voucher they could gain.

The discount rate was in the previous chapter found to have an effect on the tendency consumers have to send a SMS. The average percentage frequency of respondents sending the SMS when the discount rate entitled to was 15%, was 12% higher compared to when the discount rate was 5%. Furthermore, it was discovered in the previous chapter that respondents in a stronger manner answered that they would send the SMS, when the discount rate in the voucher was higher.

In addition, respondents were asked to consider if they would send a SMS to get a voucher, depending on at what point in time they were supposed to use the voucher. The empirical findings are somewhat hard to interpret. However, clear is that if this factor does have an effect, the effect is not that respondents tend to send the SMS to greater extent if their intent is to use the voucher they gain in a near future. If that would have been the case, the possibilities of measuring advertising effectiveness of a campaign would have been limited to a short time horizon after exposing consumers. The importance of this finding will be further discussed in the next section.

The number of respondents that would send a SMS, requesting for a voucher, as a result of exposure to a digital signage advertisement, was in general high. When the discount rate was 15%, in average 88.3% of the respondents would send a SMS, whereas when the discount rate was 5%, on average 76.3% of the respondents would send a SMS. The general average of respondents that would send a SMS is 82.3%. The degree of relevance or possible gain for the respondents does affect their tendency to interact with the digital signage platform. However, even if the possible gains are as small as a 5% discount, the tendency respondents have to interact through SMS with the digital signage platform is high.

The findings clearly shows that respondents to great extent are stimulated to interact with digital signage platforms through SMS after getting exposed to advertising, presuming that the content of the advertising is relevant. Therefore H1 is accepted.
6.2 Hypothesis 2

It was also hypothesized that: ” H₂ Permission based mobile advertising, i.e. promotional offers (vouchers) sent to consumers mobile phones, as a consequence of SMS-interaction with a relevant digital signage advertisement, will be used if actions such as purchases are taken.”

Getting consumers to interact with digital signage platforms through SMS is for the method of measuring advertising effectiveness that is examined in this study, very crucial in order to reach out with promotional offers in form of vouchers. However, not until the voucher is used, it is possible for advertisers to collect the data that ultimately gives the possibility to measure advertising effectiveness. In other words, there has to be an association between consumers interacting and using vouchers when purchasing. In such case data can be collected which can be used to calculate the effectiveness of the advertising. To what extent the measurement is enabled, depends on with what frequency consumers tend to interact and use the promotional offers that are sent after interaction.

Let us start by looking at the association between respondents both sending the SMS and using the voucher. This association is very strong. On average 96.5% of respondents that would send the SMS, would also use the voucher. The frequency ranges from 92% to 98%. No extraordinary tendencies associated with discount rate in the voucher or time for usage of the voucher can be discovered.

Furthermore, the empirical findings show that a high frequency would both send the SMS and use the voucher. The frequency ranges from 66% to 88% and the average frequency is 79.5%. Regarding the discount rate in the vouchers impact on respondents' tendency to both send the SMS and use the voucher, the tendency is the same as for sending the SMS. Respondents tend to both send the SMS and use the voucher with a higher frequency when the discount rate is higher. The tendencies being the same is obviously explained by the strong association between respondents that would send the SMS and both send the SMS and use the voucher. When the discount rate is 15%, the average frequency of respondents both sending the SMS and using the voucher is 86%. When the discount rate is 5%, the average frequency is 73%, a difference of 13%. This might seem obvious, but interesting is that even though the discount rate is relatively low the tendency to both send the SMS and use the voucher is high.

It is interesting that the findings show that the respondents does not have a tendency to send the SMS and use the voucher to greater extent, when the time for usage of the voucher, is in a near future after receiving it. It should be kept in mind that through the scenario described in the questionnaire, it is presumed that the respondents already have an intention to purchase. Therefore, if respondents would have had a tendency to send the SMS and use the voucher to greater extent when time for usage of the voucher is in a near future after receiving it, an advertiser’s possibility to measure the effect of advertising would have been more limited. However, since the time for using the voucher do not have any such effect, advertisers will have the possibility to collect data associated with a campaign for at least a time period of one month after exposing consumers. On the other hand, this also means that it will take longer time before final results of a campaign can be evaluated. However, results can continuously be preliminary evaluated, and such evaluation will provide very valuable information.
The respondents generally answered that they would use the voucher in a very strong manner, regardless of discount rate or time for using the voucher. In other words, the respondents would generally for sure use the voucher if they request it to be sent to their mobile phones.

The general tendencies are the same for both sending the SMS and using the voucher as it is for sending the SMS. The frequencies of respondents both sending the SMS and using the voucher are in general high. The possible gains do have an effect on the respondents’ tendency to use the voucher. However, even though the possible gains are relatively low, the tendency to use the voucher is high. In addition, the association between respondents that would send the SMS and use the voucher is very strong. Furthermore, the respondents answering that they would use the voucher did so in a strong manner. Therefore $H_2$ is accepted.

### 6.3 Other findings

The sets of behavioral and attitude questions included in the questionnaire, showed some interesting results. The general attitudes towards advertising among respondents are slightly positive and the general involvement in sales promotions is relatively high. Those two findings are in no way sensational. Especially not when considering the high frequency of respondents willing to send a SMS in order to get a promotional offer, and in addition the high frequency of the respondents that would also take advantage of the offer.

Interesting is though, that the respondents had a very negative attitude towards mobile advertising, but yet most of the respondents would not hesitate to request such advertising. The negative attitudes are most likely associated with perceptions of mobile advertising that are synonymous with mobile advertising as it should not be carried out. Mobile advertising have by many marketers been abused as a mean of marketing and unfortunately that abuse still exists. The abuse normally consists of sending SMS advertisements to consumers who are not interested in receiving that particular kind of advertisement. The impact is then that the advertising has negative consequences, both for the brand in question and for mobile marketing as a phenomenon.
Chapter 7 Conclusion

In this chapter the research question will be answered, contributions of the study will be discussed and suggestions for future research will be given.

7.1 Answer to the research question

The empirical findings showed results that spoke in favour for accepting both $H_1$ and $H_2$. Presuming that digital signage advertisements which respondents gets exposed to are relevant, respondents do in general to a great extent tend to interact with the advertisement through SMS in order to receive a promotional offer in form of a voucher. The level of relevance of the advertisement, speaking in terms of discount rate possible to gain, do affect respondents tendency to interact, the higher discount rate the higher rate of interaction among respondents. However, even though the discount rate possible to gain is relatively low, the frequency of interaction is high. In addition respondents do not tend to interact to greater extent the closer into the future the promotional offer is intended to be used. If that would have been the case the time horizon within which advertisers are able to measure ROI would be limited. Furthermore, respondents that would send a SMS and by doing that interacting with the digital signage platform in order to gain a voucher would to a very great extent also use the voucher.

The research question for this study was:

How efficient can ROI of digital signage advertising be measured when combining digital signage with mobile advertising?

This question is now possible to answer. Recall that in chapter 3, Fig.1 shows the chain of events that needs to occur to enable measurement of ROI of digital signage. The first step was digital signage. The digital signage should ideally stimulate SMS interaction, which is the second step of the model and also one of the two steps that have been in focus for investigation in this study. According to the empirical findings digital signage does to a great extent stimulate SMS interaction. The next step of Fig.1 is permission based mobile advertising which will be the result of the SMS interaction. The fourth step is consumer action/using voucher. This is the second step that has been under investigation when performing this study. The empirical findings show that consumers will after requesting a promotional offer also to a very great extent use it when taking an action such as a purchase. The fourth step is what is ultimately enabling the fifth step in Fig.1, ROI measurement of the digital signage.

Supported by the empirical findings, the answer to the research question is: If advertisers succeed in reaching out with relevant advertising enough, ROI of digital signage can in an efficient way be measured by combining digital signage with mobile advertising. The SMS-function when integrated with a digital signage platform is an efficient tool for ROI measurement of digital signage.
7.2.1 Contributions of the study

The sample used for this study is not representative for the population and the result of a study with the population used for this study cannot be widely generalized. The result of this study does therefore not contribute to any broader knowledge. However, the approach used in this study makes the study contribute with interesting indications regarding how and how efficient outcomes of digital signage advertising can be measured, and how consumers responds to encouragement to SMS-interaction. This will be discussed in the next two sections.

7.2.2 Measure outcomes of digital signage

Despite limitations associated with the methodological approach, the results of this study are very interesting. The method for measuring ROI of digital signage advertising that was tested is relatively un-complex to implement. Furthermore, any company, big or small can use it and benefit from it. This study shows that by implementing the method, advertisers can efficiently determine exactly what they want, actual revenues generated by/associated with advertising.

This method can be compared to the statistical model developed by Rust et.al. (2004), which might sometimes be a good tool to use for estimating outcomes of advertising, however, it lacks simplicity and requires a lot from a company implementing it. In addition, the outcome is estimated and not an actual outcome of advertising.

It should be made clear that the method tested in this study cannot determine all revenues generated from a campaign. Some people might buy a product/service as a result of digital signage advertising without interacting and thereby not gaining a voucher they can use. Such revenues can obviously not be associated with a certain campaign and will not be included in ROI calculations. Hence there is a possibility that the actual ROI is higher than what can be calculated. On the other hand, some revenues associated with a campaign through consumers usage of vouchers might have been obtained even if exposure to digital signage advertising would not have occurred. In addition, carryover effects of advertising also have an impact when it comes to determining revenues generated by a campaign. A carryover effect might bias the ROI calculations in the sense that the revenues are not only generated by one single campaign. However, the second and the third issue should not be given too much attention since the revenues clearly, at least partly, are generated by the campaign which make the consumer execute a purchase.

In terms of measuring outcomes of digital signage advertising, this study contributes with indications suggesting that the method tested efficiently can be used for its purpose. Companies using digital signage as a medium for advertising could therefore benefit from this method of calculating ROI regardless of the company´s size. Companies can use the method both as a complement and as an alternative to statistical models.

7.2.3 SMS-interaction

Another interesting aspect of the result of this study regards the tendency consumers have to interact when encouraged to. In previous studies of this matter, the results regarding consumers attitudes towards interactive features of advertisements has been negative and responses through SMS after being encourage to has been very moderate. In Trappey and Woodside (2005), only
4% responded that they had ever responded by sending an SMS to a number printed/seen in any kind of advertisement. In this study on average 79.5% said that they would send an SMS when encouraged to by relevant digital signage advertising. It is of course a difference between what someone claims that they would do and what someone actually have done. However, this comparison is interesting to make because it indicates that consumers today are not reluctant to interact as long as the advertisements are relevant. In Drossos et.al. (2007), negative attitudes towards a brand was discovered when consumers were asked to send an SMS, i.e. interact with an advertisement, in order to gain more information. Respondents were however exposed to an advertisement that was not relevant for everybody. Furthermore, the purpose of the interaction was to learn more about the product and not to gain a promotional offer. Considering the high percentage of respondents that would interact in this study, the attitudes towards an interactive feature does not seem to be negative at all. If the attitudes were negative, the frequency of interaction should be reflected by that, which is not the case.

Previous studies on SMS-interaction rates with advertisements and attitudes towards interactive features of advertisements have showed low involvement and negative attitudes. The different results in previous studies compared with this study are very likely to depend on two factors: 1) the relevance of the advertisement used in this study, 2) the gain of interaction in this study was a voucher and not just more information.

Regarding the SMS-interaction it can be concluded from the result of this study that consumers today have a very high tendency to interact with digital signage advertisements if the advertisements are relevant and the gain of interaction is a voucher.

### 7.3 Suggestions for future research

First of all it would be interesting to see the results of a similar study to this one but with a more representative sample enabling generalization of the results. Furthermore, this study has focused on SMS as a way of interacting with digital signage platforms. However there are also other potential ways of interacting, for example through blue tooth. Efficiency of other ways of interacting is something that deserves more attention. Furthermore, this study has not taken into consideration what impact the characteristics of a digital signage platform have on consumers’ tendency to interact with them. For example what role the exposure environment plays. This is something that is important to determine in order to establish if it is possible to measure ROI of all different kinds of digital signage advertising platforms.

Another issue that is interesting to do in depth investigations of is if consumers are willing to admit advertisers to send them promotional offers at more than one occasion after the initial interaction. That is something that in this study was mentioned to be one of the fundamental benefits with combining digital signage with mobile advertising if possible to do. However, examining the issue was not within the framework for this study.
Chapter 8 Research quality

In this chapter the quality of the research will be analyzed in terms of reliability, replicability, validity and generalizability.

8.1 Reliability

In a reliable study, the measurement method will be possible to use again and by doing that the same results will be obtained (Black 1999, p.144). Therefore, reliability regards the possibility of repeating the results of a study (Bryman and Bell, 2007, p.40).

As for this study, there are no issues associated with repeating the measurement. Furthermore the results are likely to be the same or very similar if the measurement is repeated. I believe that people whom were invited to participate in the survey but did not, are in general likely to do so again, and people who did participate, are in general likely to do that again. Therefore the sample would be very similar. In addition it was a general consistency in respondents’ answers, which increases the likeliness of the results of a second measurement being consistent with the first measurement. The study can therefore be considered to be reliable.

8.2 Replicability

In order for a study to be replicable, the author needs to explain procedures associated with the study in great detail (Bryman and Bell, 2007, p.41). All steps in the measurement process of this study have been explained thoroughly. The study is thereby replicable.

8.3 Validity

Measurement validity, or construct validity address a very important issue associated with research, namely whether or not a measure instrument measure what it should measure (Black, 1999, p.35). A mistake that has been made many times by researchers is to first define a concept to measure, but then instead of actually measuring the concept, perceptions of the concept has been measured since a questionnaire has been used to ask respondents about their opinions about the concept (Black, 1999, p.36-37). In such case the measure instrument is not measuring what it should measure and consequently a validity issue occurs.

The concept that the instrument (the questionnaire) used for this study was designed to measure was: how efficient ROI of digital signage advertising with an integrated SMS-function can be measured. In order for this concept to be proven to work efficiently, a chain of events need to occur. Two of those events are direct actions that need to be taken by a consumer, namely: requesting a voucher by interacting with digital signage advertising through SMS, and using the voucher that is received as a consequence of the interaction. These two events need to occur to enable ROI calculations. The tendencies to take these two actions, presuming a given context described through the scenario in the questionnaire, was measured with the questionnaire. Respondents were in a straight forward way asked if they would take these two actions. Accordingly, the concept was measured by the measure instrument and the measurement is thus valid.
8.4 Generalizability

External validity regards if a result of a study can be generalized further than the context for the study in question (Bryman and Bell, 2007 p.42). A key criterion for the result of a study to be generalizable is that a representative sample has been used (Black, 1999, p.49).

In this study convenience sampling was used. As discussed in chapter 4, convenience sampling provides samples that can be highly unrepresentative. In this study the sample is for sure unrepresentative since it consisted only of students. The results of this study can accordingly not be generalized.
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Conference papers


Internet


Appendices

Appendix 1-English version of the questionnaire

Part 1

Please put an X next to the most appropriate answer, or indicate when asked for.

1. What is your Gender?
   Male _____
   Female _____

2. What is your age?
   Please indicate: _____

3. Are you a student of college of management at National Taiwan University?
   Yes _____
   No _____

4. Do you live in Taipei/Taipei County?
   Yes _____
   No _____
Part 2

Involvement (sales promotion deals): Please put an X above the most appropriate answer.

5. Compared to other people, I am very likely to purchase products that come with promotional offers.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

6. I am usually **not** motivated to respond to promotional deals on products.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7. I love special promotional offers for products.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

Attitudes towards advertising

8. Advertisements provide useful information.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

9. I think that advertisements are often deceptive (misleading).

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
10. I usually do not pay attention to advertisements.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disagree</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Attitudes toward mobile advertising:** Mobile advertising = ads sent to your mobile phone or other mobile hand devices

11. Mobile advertising supplies valuable information in general.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disagree</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. Mobile advertising is irritating in general.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disagree</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. Mobile advertising is entertaining in general.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disagree</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part 3

Below are some pictures that will be used to describe a scenario. Please look at the pictures and read the text under them in order to understand the scenario. Questions regarding the scenario will follow after the pictures.

Imagine that you are sitting in the backseat of a taxi in front of a screen looking like one of the screens in the pictures above.

On the screen you can choose between different contents to read as showed in the picture above, such as news sport news etc. If you want to read news from Taipei times for example, that news will be displayed when you touch the Taipei Times-box in the upper left corner of the picture.
You chose to read news from Taipei Times. When you touch the Taipei Times-box, news together with an advertisement for Far eastern Plaza Hotel in Taipei is displayed, like in the picture above. As a matter of fact, you know that you are going to spend one night in that exact Hotel.

In the advertisement for Far eastern Plaza Hotel in Taipei, there is a number to which you can send an SMS from your mobile phone (not in the picture above). If you do so, you will get an automatic reply with a voucher which will entitle you to a discount of X%, when spending one night at the hotel. To get the discount, all you have to do is to show the voucher to the staff when checking in.

Please keep the above mentioned scenario in mind. Consider the following options regarding discount rate and time for the hotel stay and answer the questions below by circling the number on the scale which best represents your perception. (Please do not consider factors such as availability in the hotel)
Questions

14. If you by sending the SMS receive a voucher entitling you to a discount rate of 15% and the time for the hotel stay is tonight, would you say that it is likely that:

You would definitely -4 -3 -2 -1 0 1 2 3 4
Not send the SMS
Send the SMS

15. Under the same conditions as in the question above and also assuming that you actually do send the SMS and receive the voucher, would you say that it is likely that:

You would definitely -4 -3 -2 -1 0 1 2 3 4
Not use the voucher
Use the voucher

16. If the voucher entitled you to a 5% discount and the time for the hotel stay is tonight, would you say that it is likely that:

You would definitely -4 -3 -2 -1 0 1 2 3 4
Not send the SMS
Send the SMS

17. Under the same conditions as in the question above and also assuming that you actually do send the SMS and receive the voucher, would you say that it is likely that:

You would definitely -4 -3 -2 -1 0 1 2 3 4
Not use the voucher
Use the voucher

18. If the voucher entitled you to a 15% discount and the time for the hotel stay is in one week, would you say that it is likely that:

You would definitely -4 -3 -2 -1 0 1 2 3 4
Not send the SMS
Send the SMS

19. Under the same conditions as in the question above and also assuming that you actually do send the SMS and receive the voucher, would you say that it is likely that:

You would definitely -4 -3 -2 -1 0 1 2 3 4
Not use the voucher
Use the voucher
20. If the voucher entitled you to a 5% discount and the time for the hotel stay is in one week, would you say that it is likely that:

You would definitely .....-4 .....-3......-2......-1......0......1......2......3......4..... You would definitely
Not send the SMS
Send the SMS

21. Under the same conditions as in the question above and also assuming that you actually do send the SMS and receive the voucher, would you say that it is likely that:

You would definitely .....-4 .....-3......-2......-1......0......1......2......3......4..... you would definitely
Not use the voucher
Use the voucher

22. If the voucher entitled you to a 15% discount and the time for the hotel stay is in one month, would you say that it is likely that:

You would definitely .....-4 .....-3......-2......-1......0......1......2......3......4.....You would definitely
Not send the SMS
Send the SMS

23. Under the same conditions as in the question above and also assuming that you actually do send the SMS and receive the voucher, would you say that it is likely that:

You would definitely .....-4 .....-3......-2......-1......0......1......2......3......4..... you would definitely
Not use the voucher
Use the voucher

24. If the voucher entitled you to a 5% discount and the time for the hotel stay is in one month, would you say that it is likely that:

You would definitely .....-4 .....-3......-2......-1......0......1......2......3......4.....You would definitely
Not send the SMS
Send the SMS

25. Under the same conditions as in the question above and also assuming that you actually do send the SMS and receive the voucher, would you say that it is likely that:

You would definitely .....-4 .....-3......-2......-1......0......1......2......3......4..... you would definitely
Not use the voucher
Use the voucher
Appendix 2-Chinese version of the questionnaire

Part 1

請在您認為最適合的答案上畫個 X，或用文字表達之。

1. 您的性別是?

   男性 _____
   女性 _____

2. 您的年齡是?

   請填寫: _____

3. 您是否為國立台灣大學管理學院的學生?

   是 _____
   否 _____

4. 您是否住在大台北縣市/地區?

   是 _____
   否 _____
Part 2

對於促銷方案的投入程度：請在您認為最適當的選項上打個 X。

5. 和他人相較，我很樂於購買促銷中的產品。
   
   非常不同意  不同意  無意見  同意  非常同意

6. 通常我對促銷中的產品，並無特別強烈的反應。
   
   非常不同意  不同意  無意見  同意  非常同意

7. 我喜歡針對產品的促銷方案。
   
   非常不同意  不同意  無意見  同意  非常同意

對於促銷廣告的態度

8. 促銷廣告提供有用的資訊。
   
   非常不同意  不同意  無意見  同意  非常同意

9. 我認為廣告富於欺騙性，並容易誤導大眾。
   
   非常不同意  不同意  無意見  同意  非常同意

10. 我對促銷廣告通常並不重視。
   
   非常不同意  不同意  無意見  同意  非常同意
對手機傳送廣告的態度：手機傳送廣告，係指傳送到你的手機或其他手持式通訊裝備的廣告。

11. 一般來說手機廣告提供有用的資訊。

<table>
<thead>
<tr>
<th></th>
<th>非常不同意</th>
<th>不同意</th>
<th>無意見</th>
<th>同意</th>
<th>非常同意</th>
</tr>
</thead>
</table>

12. 一般來說手機廣告是討人厭的。

<table>
<thead>
<tr>
<th></th>
<th>非常不同意</th>
<th>不同意</th>
<th>無意見</th>
<th>同意</th>
<th>非常同意</th>
</tr>
</thead>
</table>

13. 一般來說手機廣告是具娛樂的。

<table>
<thead>
<tr>
<th></th>
<th>非常不同意</th>
<th>不同意</th>
<th>無意見</th>
<th>同意</th>
<th>非常同意</th>
</tr>
</thead>
</table>

Part 3
下列數張圖片描述一個情境：看圖並仔細閱讀下方的文字敘述，以了解情境。隨後將會有一些與此情境相關的問題，請回答。
想像您正坐在一輛計程車的後座，面對著一個和上圖中一模一樣的螢幕。

如上圖所示，在螢幕上您可以挑選各種不同的內容閱讀，諸如一般新聞、體育新聞等。例如，假如您想閱讀英文版台北時報的新聞，只要您觸碰圖片左上方台北時報的欄位，相關新聞就會顯示。
當您點選台北時報的欄位、閱讀相關新聞時，一個台北國際遠東大飯店的廣告隨著新聞一同出現。事實上，您預定將會在這家飯店投宿一晚。

在台北國際遠東大飯店的廣告中，有一個電話號碼您可傳送簡訊(此號碼並未在例圖中顯示)。只要傳送簡訊，您將會得到一個伴隨系統自動回覆的折價券，可以在您投宿該飯店一晚給您百分之 X 的折扣。只要在登記入宿時出示該折價券給飯店人員確認。

請將上述情境牢記在心。思考一下下列關於飯店住宿折扣比率與時間的選項，然後回答下列問題，圈選最能反映您觀感的程度。 (請不要考慮飯店是否有空房等問題)。

Questions

14. 假如您傳送簡訊即可獲得今晚入住該旅館即享有百分之十五的折扣優惠，您可能會:

您一定不會傳此簡訊......-4 ......-3 ......-2 ......-1 ......0 ......+1 ......+2 ......+3 ......+4 ......您一定會傳此簡訊

15. 與上題相同的情境、前提，假設你已經傳送簡訊並已獲得折價券，您可能會:

您一定不會用折價............-4 ......-3 ......-2 ......-1 ......0 ......+1 ......+2 ......+3 ......+4 ......您一定會用折價

16. 假如折價券只能給您百分之五的折扣優惠、入住時間仍為今晚，您可能會:

您一定不會傳此簡訊......-4 ......-3 ......-2 ......-1 ......0 ......+1 ......+2 ......+3 ......+4 ......您一定會傳此簡訊

17. 與上題相同的情境、前提，假設您已經傳送簡訊並已獲得折價券，您可能會:

您一定不會用折價............-4 ......-3 ......-2 ......-1 ......0 ......+1 ......+2 ......+3 ......+4 ......您一定會用折價
18. 假如折價券能給您百分之十五的折扣優惠，入住時間為一週內，您可能會:
您一定不會傳此簡訊.....-4 .....-3......-2......-1......0....+1....+2......+3......+4.....您一定會傳此簡訊

19. 與上題相同的情境、前提，假設您已經傳送簡訊並已獲得折價券，您可能會:
您一定不會用折價.........-4 .....-3......-2......-1......0....+1....+2......+3......+4.....您一定會用折價

20. 假如折價券只能給您百分之五的折扣優惠，入住時間仍為一週內，您可能會:
您一定不會傳此簡訊.....-4 .....-3......-2......-1......0....+1....+2......+3......+4.....您一定會傳此簡訊

21. 與上題相同的情境、前提，假設您已經傳送簡訊並已獲得折價券，您可能會:
您一定不會用折價.........-4 .....-3......-2......-1......0....+1....+2......+3......+4.....您一定會用折價

22. 假如折價券能給您百分之十五的折扣優惠，入住時間為一個月內，您可能會:
您一定不會傳此簡訊.....-4 .....-3......-2......-1......0....+1....+2......+3......+4.....您一定會傳此簡訊

23. 與上題相同的情境、前提，假設您已經傳送簡訊並已獲得折價券，您可能會:
您一定不會用折價.........-4 .....-3......-2......-1......0....+1....+2......+3......+4.....您一定會用折價
24. 假如折價券只能給您百分之五的折扣優惠、入住時間仍為一個月內，您可能會:

您一定不會傳此簡訊....-4 .....-3......-2......-1......0......+1......+2......+3......+4.....您一定會傳此簡訊

25. 與上題相同的情境、前提，假設您已經傳送簡訊並已獲得折價券，您可能會:

您一定不會用折價.........-4 .....-3......-2......-1......0......+1......+2......+3......+4.....您一定會用折券
Appendix 3-Covering letter, English and Chinese versions.

Dear NTU student,

Since you have received this e-mail you are a student and you possibly have written, are writing, or will write a thesis. Many of you will use/have used questionnaires in order to conduct a survey and will be/have been depending on other people’s responses when gathering data. That is the situation I am in right now. I am a student at NTU and I am currently writing my bachelor thesis. I have selected you to participate in a survey regarding a method for measuring advertising effectiveness that I am conducting. I have kept the questionnaire short for your convenience, it only takes 5 minutes to complete and I would really appreciate it if you help me by answering it. Just click on the link below to get directed to the survey web page, or copy the link and paste it in your web browser.

http://advertisingeffectiveness.questionpro.com

Your participation is extremely important for me!

Best regards,

Fredrik Helander

親愛的台大同學們:

當您收到這封 EMAIL 您是學生而您可能已完成，正在寫論文或是您即將要寫論文。相信你們也可能需要使用問卷調查並依據其他人的回答來蒐集您要的數據，這正是我現在的情況。我是台大的學生而且我現在正在寫我的論文，我選了你們來參與這項廣告效益評估方法的調查。為了您的方便這項問卷我已截短約五分鐘內完成，非常感謝你撥冗回答這個問卷調查。您只要直接的點選以下的網址便可連結到該網頁或是直接 COPY 該網址並貼上在你的瀏覽器上。

我非常重視您的參與和幫忙!

http://adeffectiveness.questionpro.com

謝謝

何夫迪
Appendix 4-Distribution along the yes-scale, use-histograms

Fig. 15 Use 15% Today

Fig. 16 Use 5% Today

Fig. 17 Use 15% One week

Fig. 18 Use 5% One week

Fig. 19 Use 15% One month

Fig. 20 Use 5% One month