

Psychological goal framing in promoting IT-infrastructure services - analysis of goal framing effect between IT-professionals and students

Information Systems Science
Master's thesis
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2011



Aalto University
School of Economics

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26.05.2011
Information and Service Management

Approved in the Department of Information and Service Economics xx.xx.2011 and awarded the grade

1st inspector's first name family name 2nd inspector's first name family name

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Objectives of the study

The psychological dimension in human decision making is becoming increasingly important in the world where individuals are dealing with massive amounts of information. When facing the complexity in decision making our brain is designed to make various mental shortcuts. The framing effect provides evidence on the existence of these shortcuts.

The empirical objective of the thesis is firstly to find out whether goal framing influences IT-decisions. Second, the thesis examines whether domain related experience shields individuals from such framing effects. Thirdly, the difference in the effect size between genders is evaluated.

Description of research

The thesis provides further understanding on the effects of goal framing and its implications on promoting IT-services. The study uses existing academic literature to build a method to measure the framing effect between the selected case company IT-professionals and the selected students of Aalto University School of Economics. The respondents are given a questionnaire containing either a gain-framed text or a loss-framed text on the benefits of IT-outsourcing services. The research uses 50 students from the Aalto University School of Economics and 22 IT-professionals from the case company. After reading the text, the respondents filled in a short questionnaire asking their opinions on the IT-infrastructure services.

Results and Conclusions

The results of the empirical experiment do not show consistent and significant differences in the answers of the IT-professionals and students between the gain-framed and loss-framed questionnaires. In addition, no consistent and significant differences were found in the answers of male and female respondents to the gain-framed and loss-framed questionnaires. The fact that no framing effect was found provides new information of the goal framing effect in a hypothetical situation comparing the goal framing effect between high- and low involvement subjects.

Keywords: rationality, prospect theory, priming, psychological framing, goal framing

Total number of pages: 120

Psykologiset päätösilluusiot IT-infrastruktuuripalveluiden myynnissä – analyysi raamitusvaikutuksesta IT-ammattilaisten ja opiskelijoiden välillä

Tutkimuksen tavoitteet

Psykologinen ulottuvuus päätöksenteossa on muodostumassa yhä tärkeämmäksi näkökohdaksi maailmassa, jossa yksilöt kohtaavat suuria määriä tietoa päivittäin. Päätöksentekotilanteissa aivomme on suunniteltu tekemään erilaisia ajatuksellisia oikoteitä. Raamitusvaikutus on yksi tällainen oikotie.

Tämän tutkielman empiirinen tavoite on selvittää, vaikuttaako psykologinen raamitus päätöksentekoon IT-investointeja tehtäessä. Lisäksi tutkielman tavoitteena on selvittää vaikuttaako raamitusvaikutus enemmän opiskelijoiden kuin IT-ammattilaisten päätöksentekoon ja vaikuttaako sukupuoli raamitusvaikutukselle altistumiseen.

Tutkimuksen toteutus

Pro Gradu –tutkielman tavoitteena laajentaa psykologisten päätösilluusioiden vaikutusten ymmärrystä IT-palveluiden myynnin näkökulmasta. Tutkielma käyttää olemassa olevaa akateemista kirjallisuutta ja rakentaa menetelmän, jonka avulla psykologisen manipuloinnin vaikutuksia mitataan case-yrityksen IT-ammattilaisten ja Aalto yliopiston kauppakorkeakoulun opiskelijoiden välillä. Molemmista ryhmistä tutkimukseen osallistuviin vaikutettiin käyttäen IT-palveluiden hyödyistä kertovaa tekstiä. Tekstistä käytettiin kahta versiota, joista toinen oli muotoiltu painottaen IT-palveluista saatavia hyötyjä (A). Toinen versio oli muotoiltu painottaen IT-palveluiden käyttämättä jättämisestä koituvia hyötyjen menetyksiä (B). Tutkimus muodostaa kattavan kirjallisuuskatsauksen psykologiseen tiedonkäsittelyyn ja tarjoaa lukijalle tietoa tekijöistä, jotka vaikuttavat raamitusvaikutuksen suuruuteen.

Tutkimuksen tulokset

Tutkimuksen tulokset eivät osoita johdonmukaisia ja merkittäviä eroja IT-ammattilaisten ja opiskelijoiden vastauksissa A- ja B –versioiden välillä. Lisäksi miesten ja naisten vastausten erot eivät olleet merkittäviä A- ja B- versioiden välillä. Tutkimuksen tulokset antavat lisää tietoa psykologiseen raamitusvaikutukseen vaikuttavista tekijöistä uudenaikaisessa tutkimusasetelmassa, joka vertaa raamitusvaikutuksen eroja hypoteettisessa päätöksentekotilanteessa asiantuntijoiden ja opiskelijoiden välillä.

Avainsanat: rationaalisuus, prospektiteoria, raamitusvaikutus

Sivumäärä: 120

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1 Introduction

Academic research in economics, marketing and finance is strongly affected by the increasing awareness of the seemingly irrational aspects in human behaviour. The global financial crisis, increased competition and the advancement of science & technology have helped to emerge variants of traditional social sciences. New fields of research, such as behavioural finance and neuromarketing have surfaced to explain anomalies in the financial markets and why consumers so often fail to act according to what is defined as rational. The *framing effect* is a central psychological phenomenon that has contributed significantly to the research in these relatively new fields of research. The prospect theory from Daniel Kahneman and Amos Tversky published in 1979 provided the first and most cited theoretical fundamentals for the academic research in *psychological framing*. The fact that the original article from Kahneman & Tversky “Prospect Theory: An Analysis of Decision under Risk” remains the most cited article in *Econometrica*, tells about the applicability and relevance of *psychological framing* in several fields of research.

The academic research in *psychological framing* focuses on the effect on individuals’ behaviour that is caused when the same information is presented in either negative or positive terms. The scientific study of the *psychological framing effect* started when Daniel Kahneman & Amos Tversky stated in their prospect theory that individuals act differently depending on how the situation is framed. The number of academic articles on the topic began to increase in the 1980’s (Maule, 1994). So far, the *framing effect* on individuals’ decisions has been studied in various contexts, such as in relation to tax evasion (Maule, 1994), gambling (Tversky & Kahneman, 1981), product selection (Jalleh & Donovan, 2001), politics (Maule, 1994) and clinical reasoning (Banks et al. 1995), to name but a few studies.

What makes the topic particularly interesting is the broad applicability of *psychological framing* to research designs. Corporate strategy is one topic among the numerous domains where the concept of *psychological framing* can have crucial effects. For example Wickham (2007) states that understanding why we say something is very important and that the basics of *psychological framing* should be a part of every strategist’s tool kit.

Although the service industry has already dominated the global economy for some decades (Maule, 1994), there exists limited research in the effects of *psychological framing* in the service industry. Moreover, there exists no research in application of the *framing effect* on the IT-service industry. Despite the breath of research in *psychological framing*, the concept has not been previously tested in the domain of IT-service industry. In addition, differences in the *framing effect* between experts and students have not been previously researched in a domain where decisions are in general seen to be characterised by significant amounts of money, elaborate analyses and objectivity. So far, plain student samples have been the most represented group of test subjects in academic articles (Kuhberger, 1998), (Pinon & Gambara, 2005). Previous research concerning the differences between experts and novices is limited to the context of retail consumers (Maule, 1994; Bettman & Sujan, 1987) and expert & novice physicians (Maule, 1994). The purpose of this thesis is to address these research gaps by extending the research in *psychological framing* to the IT-service industry and to provide additional insights into the difference in the *framing effect* size between subjects with high intrinsic self-relevance (IT-professionals) and subjects with low intrinsic self-relevance (students) (Khristnamurthy et al. 2001). Motivated by this background, this thesis extends the research in goal framing to the IT-service industry. The objective is to find out how simple written manipulations can affect respondents' views on *IT-infrastructure services*.

1.1 Research objectives

The theoretical objective of the research is first to establish link between *psychological framing* and its various applications in economic sciences as well as to provide insight into how academic research in marketing acknowledges the role of psychology and cognitive biases in decision making. Second, the thesis provides a new categorization on goal framing research by providing a review on the variables that have shown to affect the goal framing effect size.

After the theoretical literature review, the empirical experiment is conducted to test and analyze the findings of the literature review on *psychological framing* in the context of promoting *IT-infrastructure services*. The empirical objective of the thesis is firstly to find out whether goal framing influences IT-decisions. Second, the thesis examines whether domain-related experience shields individuals from such framing effects. Thirdly, the difference in the effect size between men and women is evaluated.

To test how framing affects the IT-professionals' and students' views on *IT-infrastructure services*, the thesis adapts the widely-used categorization of Levin et al. (1998) and distinguishes the framing effect into three modes: risky choice framing, attribute framing and goal framing. This thesis will focus on goal framing, where the subjects are influenced by showing them statements, equal in substance, framed either in terms of obtaining a gain (gain-framed message) or in terms of not obtaining a gain (loss-framed message). The research follows earlier empirical settings in goal framing research (Hasseldine & Hite, 2003; Ganzach & Karsahi, 1995; Cox & Cox, 2001) and formulates the positive frame by a using written text that tells the gains of obtaining *IT-infrastructure services*. The loss-framed text is formatted based on the gain-framed framed text but is framed in terms of gains lost when not obtaining *IT-infrastructure services*. After reading the text, the respondents are asked to fill in a survey regarding their views on the described *IT-infrastructure services*. The existence of the goal framing effect is determined based on the survey answers given by the IT-professionals and students. To conclude, the objectives of the thesis are restated below.

The theoretical objectives of the research are:

- 1: To introduce how psychological framing is connected to research fields in economic sciences and to provide insight into how academic research in marketing acknowledges the role of psychology and cognitive biases in decision making.
- 2: To establish categorization on the variables influencing the goal framing effect.

The empirical objectives of the research are as follows:

- 3: To observe whether the views of the case company IT-professionals and students on *IT-infrastructure services* can be affected by using goal framing. This is done by *priming* the respondents with written gain- and loss-framed material.
- 4: To observe whether the goal framing effect among the IT-professionals is stronger or weaker than that of the selected students from the Aalto University School of Economics.
- 5: To observe whether the goal framing effect is stronger among male or female respondents or vice versa.

Academic research findings on *psychological framing* are not unified. Although there is no consensus regarding any systematic effects of goal framing, most of the academic articles that have managed to show goal framing effect state that the loss-framed message is more efficient to affect preferences than the gain-framed message (Levin et al. 1998; Rothman & Salovey, 1997).

The academic research has not focused on exploring the differences in the goal framing effect between experts and novices. Bettman & Sujan (1987) found out that the *framing effect* was stronger within novice consumers than expert consumers when making comparable and non-comparable purchasing decisions. The comparable purchasing situation was simulated so that the subjects were first *primed* and then asked to choose between two cameras. The non-comparable purchasing situation was simulated so that after *priming*, the subjects had to choose between a camera and a computer. Bettman & Sujan found out that in the comparable purchasing situation the *framing effect* was smaller for students that had previous knowledge in cameras and computers, i.e. “experts”. However, it is critical to notice that the research method used by Bettman & Sujan (1987) can not be counted as goal framing. In contrast, Christensen et al. (1991) and Krishnamurthy et al. (2001) found out that there were no significant differences in the goal framing effect in the medical domain. In his meta analysis on *psychological framing* Kuhberger (1998) acknowledges the fact that most research on the differences between experts and novices, (or subjects with high or low intrinsic self-relevance in relation to the empirical experiment) has been conducted on student samples. Kuhberger (1998) hypothesises that experts may also be affected by *framing* but not as much as students. Again, the effect might vary depending on which of the three framing modes are used to conduct the empirical experiment. This provides a truly interesting setting for the empirical research of the thesis.

Previous literature on *psychological framing* shows that gender affects the intensity of the *framing effect*. Research made by Wang et al. (2001) indicates that females are more affected by *psychological framing* on life-death domains, while males are more affected in the context of monetary decisions. However, according to (Fagley et al. 2010) the differences between genders might be caused by emotional differences. The academic research has not yet been able to offer consistent view on the effects of gender on *psychological framing*. Based on these results, the second purpose of the empirical research is to deepen the understanding

concerning the effect of gender on the goal framing effect.

Based on the research objectives and on the previous academic literature, initial hypothesis of the empirical research are formed as follows:

- H1:** As a combined group, the respondents answer differently to questions regarding the benefits of *IT-infrastructure services* depending on whether gain- or loss-framed material is presented.
- H2:** The responses given by students vary more between the gain-framed and loss-framed questionnaire versions than the responses given by the case company IT-professionals.
- H3:** The responses given by women vary more between the gain-framed and loss-framed questionnaire versions than the responses given by men.

The validity of hypotheses H1 and H2 is analyzed based on the differences between the answers given by the respondents when presented with the gain-framed and loss-framed texts. The combined results as well as the differences between the IT-professionals and students are analyzed. H3 is first measured by the overall differences in answers between men and women regardless of expertise on *IT-infrastructure services*. After this, the differences between IT-professionals and students are analyzed. Given the nature of the qualitative data and the sample characteristics, the research also directs significant attention to the scope, focus and limitations of the research.

1.2 Scope, focus and limitations of the research

The research scope of the qualitative empirical research is limited to the case company IT-professionals and on the students of Aalto University School of Economics. The study uses written response mode and is implemented as a between-subject study among these two groups, where the problem domain is in *IT-infrastructure services*. The generalization of the research results is discussed in Chapter 6.4.

The respondents are randomly assigned to answer the questionnaire with either gain-framed or loss-framed text. Since the research focuses on the fundamental mechanisms of how the human mind works, (i.e. general human cognitive capabilities) it can be assumed that the

possible limitations of the representativeness of the two sample groups do not significantly affect the research results.

To gather a student sample that could be regarded to be suitable for the research in terms of size, convenience sampling was used in the research to the extent that participants of three courses from the Aalto School of Economics were surveyed. In general, the three courses can be regarded to have a broad-enough scale of participants for the sample to be representative of the students of Aalto University School of Economics. Moreover, several articles that have researched *psychological framing* have used students as a sample group without any effort to investigate the representativeness of the student sample (Che & al. 2007; Donovan & Jalleh, 1999). Donovan & Jalleh (1999) even used a sample of university students as a representative group of meat product consumers.

Since the research results are qualitative by nature, they are evaluated based on whether there can or cannot be found *framing effect* and whether there exists or does not exist differences between the two groups. Given the scope of the research and the nature of the research data the statistical methods available to analyze the data are limited. This is because except for the one open-ended question, all the answers to the questions are given in ordinal scale and are qualitative by nature. It is important to remember that although qualitative approach is well-suited to conduct exploratory research in social sciences (Babbie, 1998) the method poses analytical restrictions that must be addressed in the analysis of the research results. These limitations are further discussed in Chapter 6.6.

1.3 Concepts

This chapter provides introduction to the most central definitions used in this thesis which are defined in the context of the empirical research. The chapter provides definitions for *psychological framing* (later referred to as *framing*), *framing effect*, *rationality*, *priming* and *IT-infrastructure services*. *Framing* is further explained in Chapter 3, where goal framing, along with the other modes of *framing* developed by Levin et al. (1998) are further elaborated.

1.3.1 Psychological framing & framing effect

Given the numerous research settings used in the academic *framing* research, several

definitions exist on the term. According to Druckman & Chong (2007) the concept of *framing* is a process that people use when they conceptualize their thinking of an issue. In other words, *framing* can be thought to comprise of our prior beliefs on a particular issue that can then affect our decisions on the issue. According to the original definition of Kahneman and Tversky, the *framing effect* emerges from both the formulation of the problem and the individual's personal habits and characteristics (Tversky & Kahneman, 1979). Naturally, the individual's frame of thought can be influenced by changing the way how the individual weights the different aspects of an issue, in other words, by making the individual see things as someone else sees them. In academic research this definition of *framing* is generally used when studying people's opinions on tax policies and the competence of citizens to resist manipulation efforts of politicians (Druckman, 2001). This approach to *framing* was categorized by Druckman (2001) as frames in communication.

Druckman (2001) defined his second approach to *framing* as frames in thought. When *framing* is approached from this viewpoint, the prospect theory forms the basis of several academic papers on *framing*. The main thesis of the prospect theory is that our reference point affects the way we decipher our options. When we are faced with a message framed in terms of negative terms, we start making decisions based on a different risk profile than when the message is framed in positive terms. Prospect theory and its implications to *framing* are introduced further in Chapter 3.2. Our decision frames can be influenced by different stimuli, such as written text, pictures or music & video (Adelaar et al. 2003). Several articles have studied how our opinions can be affected by for example, different wordings of the same thing. Donovan & Jalleh (1999) found out that people see meat to be more appealing if communicated in terms of lean meat content versus fat content. Based on Druckman's categorization, the research topic of this thesis focuses on frames in thought.

Kuhberger (1998) divides *framing* into similar categories as Druckman (2001). Kuhberger distinguishes the definition of *framing* in strict and loose sense. *Framing* in loose sense is related to how people's choices can not only be affected by semantic manipulations, but also by contextual features, such as environment. Strict sense of *framing* is defined as manipulation through "wording of formally identical problems" and is closely related to the axioms of the prospect theory (Kuhberger, 1998). By formally "identical problems" the thesis refers to same valence framing, where the contents of the message in both the positive frame and negative frame remain exactly the same, i.e. "If you adapt IT-services you gain benefits"

vs. “If you do not adapt IT-services you do not gain benefits”. These concepts are interrelated with Druckman’s (2001) frames in communication and frames in thought.

Levin et al. (1998) provided further elaboration to *framing* research when they published their widely-used categorization on the three modes of *framing*. Their categorization differentiated earlier research results on *framing* research into risky choice framing, attribute framing and goal framing -modes. By doing so, the researchers were able to explain some of the previously conflicting research results in *framing* research. In their categorization *framing* is defined through the above-mentioned valence *framing effect*, which refers to the differences in responses to positively and negatively framed messages. From now on, the thesis refers to positive and negative frames when *framing* is discussed in general. When specifically goal framing is discussed, thesis refers to gain- and loss-frames and more specifically gain-framed and loss-framed messages. Chapter 3 provides a review to differentiate the three modes of *framing*.

The thesis adapts the definition of *framing* in the strict sense and focuses on same valence framing. Throughout the thesis, *framing* is referred to as how our opinions can be influenced by providing the same written content in either in positive or negative terms. More precisely from the viewpoint of the empirical research, the thesis adapts the definition of Pinon & Gambarara (2005) of *framing effect* as the significant difference of observed respondents’ answers to positively and negatively framed written messages (Pinon & Gambarara 2005). Moreover, Kahneman’s (1981) definition to decision frame as “—the decision maker’s conception of acts, outcomes, and contingencies associated with a particular choice” is used. In the context of this thesis, the *framing effect* is experimented on by making simple changes to the wording of a text that is presented to IT-professionals and students.

1.3.2 Rationality

Social sciences have traditionally focused on explaining behaviour in terms of *rationality*. In economics, the *rationality* principle which describes people being capable of maximizing their gains and choosing objectively has been dominating the research in economic sciences. Blume & Easley (2008) state that although *rationality* can be defined based on psychological utilitarianism and decision theory, no single and unified definition exists.

The common definition of *rationality* is simply acting in a sane way or “in accordance with reason and logic” (Oxford Dictionaries). However, in business studies and in economics, *rationality* is often defined through the rational choice theory of microeconomics. In behavioural finance, researchers typically state that individuals fail to act rationally, since they often make decisions that do not maximize their personal monetary gains, given the information that is available in the market place (Belsky & Gilovich, 1999). In the financial markets, mistakes in trading and interpreting data are often classified as “irrational behaviour” and arbitrage is seen as the mechanism to “rationalize” the market again (Zeckhauser & Hendricks, 1991). In other words, it is assumed that if investors were fully rational, they could use all the available information when making investment decisions.

However, individuals can not purely make decisions based on the rational choice theory, i.e. take into consideration all the available information to make the optimal decision that maximizes the individual’s utility. To acknowledge this fact, Herbert Simon developed the theory of bounded *rationality* as an extension to the rational choice theory (Gigerenzer & Selten, p.4-9, 2002). The main thesis of the bounded rationality theory is that individuals strive to make the optimal decision based on the structure of their environment and their cognitive constraints (Simon, 1991). The aim of the bounded *rationality* theory is to investigate the heuristics that drive our behaviour and relax the assumption that the objective of rational behaviour would be optimizing extrinsic incentives. According to this definition of *rationality*, individuals can act rationally even if we sometimes make decisions that are not defined rational by the rational choice theory. According to (Gigerenzer & Selten, p.4, 2002), bounded *rationality* is not irrationality or optimization.

Throughout the thesis, *rationality* is defined according to the bounded rationality theory. In other words, individuals act rationally although they might end up replying differently to two formally identical problems of which one is positively framed and the other is negatively framed. This is because our cognitive capabilities create shortcuts beyond our own recognition. To facilitate and clarify our behaviour we use simple heuristics to guide us when making decisions in complex situations (Gigerenzer & Selten, 2002). To conclude, the thesis does not consider that individuals fail to act rationally although their preferences may vary when they are subjected to *framing*.

1.3.3 Priming

In media research, *priming* is closely related to agenda-setting and *framing*. The three concepts are often associated in the research of cognitive media effects. Although there exist articles focusing on distinguishing these three terms, media research has not been able to provide full consensus on how the terms should be used (Scheufele & Tewksbury, 2007). In media research, agenda-setting is usually referred to as how much press gives news coverage and importance to certain news. The most used theory in defining the terms in the context of media research is the agenda-setting theory first introduced by Maxwell McCombs and Donald Shaw in 1972. Although McCombs and Shaw acknowledged that by simply finding correlations between the issues that voters thought important and what was actually communicated by the candidates in the 1968 presidential campaign in the United States of America is not sufficient to create a theory, their results provided evidence on the possible existence of the agenda-setting phenomenon (McCombs & Shaw, 1972).

McCombs (2004) categorizes *priming* and *framing* under the second-level agenda-setting, where *priming* is defined as how the news we read, trigger certain knowledge. Because of this, our behaviour is driven towards certain direction. McCombs further elaborated the agenda-setting theory by stating that including the concept of *priming* into agenda-setting might help explain how people form their opinions on the issues they experience in the media (McCombs, 2004). Furthermore, according to McCombs, *framing* is the effect on our opinions which depends on how the media items are formulated and characterised. However, the exact relationships between the agenda-setting, *priming* and *framing* –effects have not yet been established in media research (Lee, 2010; Scheufele & Tewksbury, 2007; Scheufele, 2000).

In psychology, *priming* is defined as unconscious heightened sensitivity due to some prior exposure (Jacoby, 1983). According to Kahneman & Tversky (1973) *priming* happens when a person is subjected to stimulus which then leads to that stimulus being treated as a relevant piece of information in decision making. The mind interprets the easiness of acquiring information as an indicator on the relevance of the information. The effect of *priming* can be tested by for example using lexical decision-tasks where people are asked to identify words or

other objects after being primed with some previous stimuli.

For the purposes of the empirical research, *priming* will be defined as the effect of the stimulus on how individuals indicate their answers to the proposed questions. Therefore, *framing* can be regarded as one method of *priming*. To conclude, in the context of this thesis, *priming* is defined as exposing the selected individuals to a text that is either gain- or loss-framed with the purpose of trying to affect the respondents' preferences, i.e. frame the respondents. Within this context, *framing* and *priming* are used interchangeably.

1.3.4 *IT-infrastructure services*

In the empirical research part of the thesis, the chosen case company IT-professionals and students from the Aalto School of Economics were given a survey concerning their views on *IT-infrastructure services*. In the context of the thesis, purchasing *IT-infrastructure services* is defined as letting a specialized IT-company (outsourcing provider) to set up, operate and/or maintain either partially, or fully parts of the buyer's IT-infrastructure. According to ITILv3, a company's IT-infrastructure consists of: "All of the hardware, software, networks, facilities, etc., that are required to Develop, Test, deliver, Monitor, Control or support IT Services". The term IT Infrastructure includes all of the Information Technology but not the associated people, Processes and documentation." (Knowledge Transfer, 2011). The text used to prime the respondents includes descriptions of benefits of e.g. analytical software tools, server virtualization and solutions for mobile work force.

2 Psychological framing in economic sciences

In addition to providing literature review on the research of *framing* and moreover on goal framing, the thesis provides the reader a short review on the academic research in decision making with the objective of showing how psychological framing connects to the various research fields in economic sciences. Chapter 2 also briefly introduces some of the decision making models traditionally used by marketing with the objective of showing how these models fail to address the psychological dimension of decision making. Chapter 3 progresses to introduce the academic research in *framing* and the three different modes of *framing* by Levin et al. (1998).

2.1 Research fields in decision making

To help the reader to identify how *framing* relates to other academic fields of research in decision making, the thesis provides an overview chart on the central research fields which have in addition to cognitive psychology contributed to the academic research in decision making. These fields include microeconomics, neuromarketing and behavioural finance, to name but a few. Figure 2-1 shows an illustration on how the research in *framing* is spread among various fields of economic sciences.

Economics, psychology and marketing are the basic research fields that study how we make decisions. While neoclassical microeconomics is mainly focused on how individuals maximize their utility by following the rule of supply and demand with *ceteris paribus* assumptions, marketing research is more focused on the actual purchasing process of individuals. In Figure 2-1 below, psychology is presented between economics and marketing given the fact that research in psychology contributes to both economics and marketing in terms of decision making.

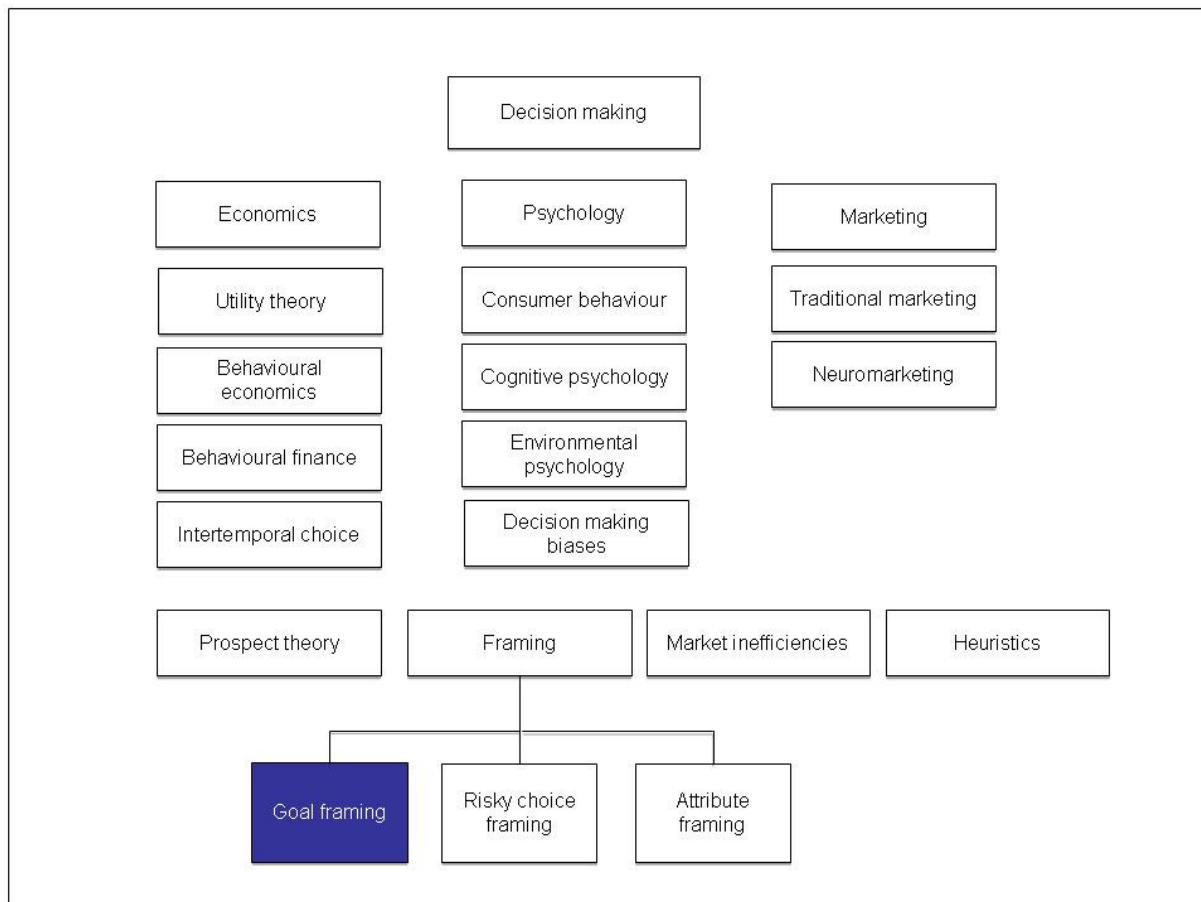


Figure 2-1: Research fields in psychological framing

According to Herbert Simon (1998) the way how decisions are seen as optimal differentiate behavioural economics from neoclassical economics. From the viewpoint of behavioural economics, neoclassical economics fails to take into account factors, such as altruism and limited human cognitive capabilities in behaviour (Simon, 1991). In addition, behavioural finance takes into consideration the biases that inhibit humans to act according to the utilitarian definition of *rationality*. As discussed, the thesis adapts the concept of bounded *rationality* and does not consider that individuals who react to *framing* behave irrationally.

The reason why the exact relationships between the various research fields have not been described in the picture is because of the numerous interrelations that exist between the fields. For example, psychology is strongly related to marketing as well as to finance and to biases in consumer behaviour. Furthermore, prospect theory is closely related to cognitive psychology, behavioural finance, *framing* and biases in consumer behaviour. The fields of research described in Figure 2-1 are interlinked with each other as they all share common aspects while at the same time contribute their unique view to decision making.

2.2 Psychological framing in marketing

In the field of marketing the academic research relating to decision making has conventionally been strongly focused on the buying process, where the consumer goes through particular phases in either sequential or non-sequential order. While the research in economics is focused on examining the combined effects of groups of people, marketing targets the decision processes of individuals and tries to explain the basis on which individuals make the decisions that lead into purchasing decision. The purpose of this chapter is not to offer an exhaustive review on decision making in the context of marketing, but rather show the reader a few examples, how the traditional concepts in marketing are not focusing to fully identify the cognitive biases of decision making, such as *framing*.

Traditional marketing models approach decision making from the rational, stage-wise perspective. Theoretical models that try to explain the process behind buying are for example the consumer information processing model (Kotler & Keller, 2005) and the hierarchy of effects model (Lavidge & Steiner, 1961). Although these models explain what aspects can affect behaviour, they fail to show how consistently the mind actually works in line with these models.

The limitations of the customer buying process were already known in the 1970's. Already in 1979 Olshavsky and Granbois argued that the decision process that leads to buying does not always exist and that in some cases the mechanics behind the buying process simply are "random". Various researches in cognitive psychology and consumer behaviour research have shown that the human mind is prone to various biases and shortcuts (Ganzach & Karsahi, 1995; Tversky & Kahneman, 1981; Tversky & Kahneman, 1974, Tversky; Kahneman, 1991; Rothman et al. 1999).

Punj & Staelin (1983) developed an application of the consumer information processing model in the context of consumer information search for automobiles. The model consists of several factors that should explain the customer buying behaviour, such as usable prior knowledge, desire to seek information, cost of external search and satisfaction, to name but a few factors. The authors then developed instruments to measure each component of the model. After this, the model components were mathematically regressed to reflect the actual buying behaviour of selected individuals. Despite the rigorous approach, the model has

considerable limitations. To predict behaviour the model included several inputs collected from the potential buyers. As always, the problem with multiple regression analysis lies within the correlation between the chosen regressors. For example, a strong correlation between one regressor and the regressand might be misleading, since the measured correlation might actually be caused by a second, unobserved factor. In addition, the disregarded effects of psychological aspects in decision making are likely to be buried under the input measure of prior knowledge (a self-report measure on the buyer's opinion on the goodness of the deal on the first day when the person was thinking to buy the car) or the measure of overall satisfaction (Punj & Staelin, 1983).

Another problem with consumer information processing models lies in the limited possibilities to replicate the models in another setting (Kollat & al. 1970). For example, the model proposed by Punj & Staelin (1983) is only applicable in a situation of buying cars, whereas several replicated studies exist in framing research. For example, the same principles of framing have been used in several academic articles and the famous Asian disease problem by Kahneman & Tversky (1979) has been replicated in various empirical research settings and applied in various contexts.

Although decision making models in marketing do not directly include the cognitive aspects of human behaviour, Holbrook & Hirschman (1982) point out that in addition to the traditionally considered environmental and human inputs in consumer information processing models, an intervening response system exists that considers cognition as one of the inputs that affects consumer decision making. However, according to Holbrook & Hirschman (1982) such advances have only been made in the research of cognitive processes, such as fantasies, pictorial imagery and daydreams, not in the research of decision making biases.

Another model used in marketing to interpret consumer behaviour is the hierarchy of effects model first introduced by Lavidge & Steiner in 1961. While the consumer information processing model is designed to show how individuals gather and process information around their purchasing decisions, the hierarchy of effects model is designed to measure the effectiveness of advertising efforts. Though the model has several variations, the original model contains the following layers: awareness, knowledge, liking, preference, conviction and purchase. The conative dimension is defined by the authors as the "motivational component" that can change the individuals' opinions on the product to be either positive or

negative. The model can be thought as a typical sales pipeline, where the awareness of the consumer is first established. After this, the client receives more and more information on the product. Eventually this experience builds up to appeal towards the product and leads into purchase.

Although the model contains affective and conative dimensions, the model fails to elaborate on the effect of human cognitive biases decision making and simply refers to brand image when it comes to the affective and conative dimensions. The authors propose that affective and conative dimensions should be measured by asking the consumers about their preference of brands and about how they see certain products. To measure the conative dimension, the authors propose split-run tests, which are done by making two versions of the same advertisement which are then distributed so that different consumers are reached. The effectiveness of a split-run test can be measured by e.g. number of client contacts on a particular area. Although the split-run tests can reveal how e.g. differences in the wording of two different versions of advertisements can affect client behaviour, the hierarchy of effects model does not suggest that these tests should be particularly used to systematically analyse cognitive biases. Moreover, the model proposes that differences in the results of split-run tests should be categorized under the conative dimension. Beyond this, the model does not offer any additional assistance when it comes to analyzing the results further. In other words, the hierarchy of effects model fails to explain the exact reasons why different promotion efforts might possibly evoke more positive behaviour than others.

This chapter provided an introduction to the most traditional models in marketing which are used to evaluate behaviour of individuals. The chapter started by introducing the consumer information processing model and the hierarchy of effects model. Both models fail to adequately address the role of cognitive biases in decision making. It is clear that the mechanics of decision making are far more complex than these models let us assume. To analyze the decision making of individuals further, psychological aspects need to be considered more systematically. The objective of this thesis is to contribute to this research. Chapter 3 begins by providing literature review on academic research in *framing*, an important psychological aspect that has proven to affect the decision making of individuals.

3 Academic research in psychological framing

The literature review in this chapter is meant to offer the reader a brief introduction to *framing* based on the categorization of Levin et al. (1998). After this, this Chapter 4 elaborates on the concept of goal framing and provides further information on the academic research in the variables that have studied to affect the goal framing effect. The literature review in Chapters 3 and 4 is used to analyze the results of the empirical goal framing experiment conducted on the IT-professionals and students.

3.1 The study of psychological framing

To provide a thorough understanding on the foundations and motives underlining the study of *framing*, a historical perspective is needed. As was discussed in Chapter 1, the concept of *rationality* was strictly defined in the context of economics until the 1950's when Edwards (1954) proposed human decision making as a topic that psychologists should direct attention to. In 1953 Allais introduced his famous paradox which clearly conflicted with the axioms of the expected utility theory by showing that individual' preferences on risky gambles and risk free gains vary based on how the two options are presented, although in both cases the expected value of the risk free choice and gamble are the same (Allais, 1953; Kungliga Vetenskapsakademien, 2002)

The concept of human *rationality* was first defined as the ability to objectively assess one's environment and make decisions based on the content of information. Once the research in decision making progressed, researchers began to understand that the utilitarian definition of *rationality* did not fully explain human behaviour. By acknowledging that also the context and form of our observations can be regarded as information and thus be regarded as input in rational decision making provided further insights to research. The prospect theory was the first significant scientific step that provided the leap from the expected value theory to include the psychological aspects of decision making.

The prospect theory also introduced the foundations of framing research. *Framing* was further categorized in three distinct modes by Levin et al. (1998), namely risky choice framing,

attribute framing and goal framing. Levin et al. (1998) argued that the experiment designs used by Kahneman & Tversky explained the empirical results of *framing* experiments only to certain extent. To provide additional coherence to the research results, Levin et al. (1998) argued that the approach established by the prospect theory did not fully explain the research results by attribute framing and goal framing. This thesis focuses on contributing to the academic research in goal framing through.

Once the research in *framing* started to grow, many researchers contributed to the field with their own research articles. However, the problem was still that there was lots of variance in the research results. Similar-looking research settings seemed to provide different results making it difficult for the researchers to establish common ground of how *framing* can affect the individual's behaviour. The literature review in Chapters 3 and 4 shows that articles on *framing* have been published on various research domains but results of these articles are not unified. The existing research has not yet established full consensus on how *framing* affects behaviour.

According to Levin et al. (1998) the fact that no earlier consensus was established was because more than one type of *framing* should be identified. After categorizing academic articles into the three modes of *framing*, it was also possible to categorize the earlier research results and consensus could be more easily established within the different modes of *framing*. The literature review also reveals that comparison on the effects of *framing* between different groups of people, e.g. students and IT-professionals, has not been significantly focused on. Chapter 3.2 continues now the literature review by first providing introduction to prospect theory which provides the fundamentals for *framing* research. The chapter continues by providing information on the academic research in risky choice framing, attribute framing and goal framing.

3.2 Prospect theory

As discussed, the foundations of the *risky choice framing* lie in the prospect theory developed by Daniel Kahneman and Amos Tversky. Compared to the earlier research in human decision making, the fundamental difference of the prospect theory to utility theory was the introduction of subjectivity into the world of perfect decision making. The main idea of the prospect theory was that individuals' decisions should not be judged based on their final

assets, but according to gains and losses (Kahneman & Tversky, 1979). The model was a direct critique towards the expected utility theory. The researchers used empirical evidence to prove their thesis against the expected utility theory changing the research in human decision making from axiomatic to descriptive research (Kungliga Vetenskapsakademien, 2002). The main findings of the original article on prospect theory by Kahneman & Tversky are:

The reflection effect:

People are generally more willing to prefer risky options when these options are introduced in terms of losses. For example in their original article Kahneman & Tversky showed that 92% of people prefer to a chance to loose 4000 or to loose 0 with probabilities 80% and 20% respectively over a sure loss of 3000 in terms of Israeli currency. (Kahneman & Tversky, 1979)

Certainty effect:

People are generally more willing to choose the “sure thing” –option than the risky option when the decision-problem is framed in terms of gains instead of losses.

Isolation effect:

When evaluating their choices, people tend to disregard what is common between the choices and only focus on the differences between the choices. This effect was demonstrated by Kahneman & Tversky by showing that when first given 1000 units of currency at one test subjects chose a gain of 500 units of currency over a change to win 1000 units with the probability of 50%. On the second test the gains were turned into losses, but now the subjects were offered 2000 instead of 1000 in the beginning. In this case, the subjects chose the risky option. In terms of expected utility the problems where identical. According to the certainty effect, the subjects should have chosen the latter problem giving 1500 for sure over the first problem offering a chance of (2000, 0.5; 1000, 0.5).

Shifts of reference:

Depending on the reference point, a person can consider events as gains or as losses. For example, an unexpected tax withdrawal can be considered as a loss. Instead, an unexpected tax refund can be considered as a gain. Recently in Finland companies have appeared that offer the possibility for a person to receive a part of his/her tax return earlier giving the company the right to receive the full tax return of the person when due. This kind of approach

may relate to the shifts of reference –effect by making the person consider the money received from the company as a gain instead of a credit with high interest rate. (Kahneman & Tversky, 1979)

By using the above-mentioned findings of the prospect theory, namely the certainty effect, the reflection effect and the shifts of reference –effect, the researchers formed the foundations of *framing* research. In 1981 Kahneman & Tversky showed that the underlying assets or bets are not relevant when it comes to how individuals make decisions (Kahneman & Tversky, 1981). In their article, *The Framing of Decisions and the Psychology of Choice*, Kahneman & Tversky introduced the classical Asian disease –problem (ADP) that is widely cited in the academic research of *framing* and acts as the basis of reference for many research articles on *framing* (Kahneman & Tversky, 1981; Kuhberger, 1998; Pinon & Gambaro, 2005).

The Asian disease problem contains two different versions of types of questions. After reading the instructions respondents are asked to indicate their preference in terms of how to act in case of an unusual Asian disease expected to hit the U.S.A. The respondents are asked to choose between two alternative programs to combat the disease. The first version of the problem is framed in terms of saving lives; the second version is framed in terms of losing lives. The two program alternatives in the lives-saved frame are stated as follows: “if Program A is adopted, 200 people will be saved” and “If Program B is adopted there is 1/3 probability that 600 people will be saved and 2/3 probability that no people will be saved”. In the lives lost scenario, the alternatives are framed as follows: “If Program C is adopted 400 people will die” and “If Program D is adopted there is 1/3 probability that nobody will die and 2/3 probability that 600 people will die. (Kahneman & Tversky, 1981)

The respondents of the original experiment were college students studying at Stanford University and at the University of British Columbia, in the U.S.A. In the first –scenario the sample size was 152 students and in the second scenario 155. The research was done as a between-subjects study, i.e. the respondents indicated their preferences either to the lives lost or lives saved –scenario, not both. 72% of the respondents of the lives saved scenario chose the sure-thing option. In the lives lost –scenario the trend was reversed: 78% of the respondents chose the risky option. (Kahneman & Tversky, 1981)

As proven by the prospect theory, when the questionnaire is framed in terms of saving lives,

most people choose the sure thing option of saving a certain number of lives as opposed to a gamble of saving more lives but at the same time risking a certain chance of saving no lives. In the negatively framed version, the question is introduced in terms of people dying. As suggested by the prospect theory, in the second version people prefer to choose the risky option. In terms of expected utility, in both the versions, the alternatives provide the same expected amount of lives remaining and respondents should be indifferent between the two scenarios. The study indicates clear shift of preference between the negative and positive framed message. (Kahneman & Tversky, 1981)

3.3 The three modes of framing

The prospect theory is regarded as the theoretical foundation of *framing* research. This chapter introduces the three different modes of *framing* based on the categorization by Levin et al. (1998). The definition, typical research settings and research implications are briefly discussed for each mode. Chapter 4 continues the literature review by providing further information on the results of research in goal framing.

The categorization by Levin et al. (1998) differentiates the risky choice framing, attribute framing and goal framing in terms of the framed stimulus, the target of the framing effect and the typical measurement techniques of the framing effect (Levin & al, 1998). The important aspect to remember is that the framing modes mentioned below belong to the category of valence framing. This means that the academic research in the three modes of *framing* only focus on indicating the framing effect when the content of framing stimulus is the same in both frames. In other words, the framing stimulus is equivalent in terms of structure and the content of information. An example of a statement that can not be used in valence framing is for example: “*By adopting IT-infrastructure services you can gain significant advantages and considerably increase your performance*” vs. “*By not adopting IT-infrastructure services you can not gain any advantages and will loose the competition*”. As a comparison, a valence consistent message would be “*By adopting IT-infrastructure services you can gain significant advantages.*” vs. “*By not adopting IT-infrastructure services you can not gain significant advantages*”. Kuhberger (1998) refers to problems with same valence as “logically equivalent choice” problems. Chapter 5.2 further elaborates this aspect. Table 3-1 provides methodological summary of the three modes of framing as well as examples of academic research under each mode.

Table 3-1: Summary of framing methodologies (Levin et al. 1998)

Frame mode	What is framed	What is affected	Measurement
Risky choice framing	Set of options with different risk levels	Risk preference	Comparison of preferences for risky and risk free options in positively framed and negatively framed scenarios
example: Asian decease problem	Consequences on the lives of US. citizens	Willingness to engage risk-free or risky actions Scenarios framed in terms of lives saved and lives lost	Comparison of preferences between the risk-free option and the risky option in the lives lost and lives saved scenarios
Attribute framing	Object/event attributes or characteristics	Item evaluation	Comparison of attractiveness ratings for the single item in scenarios framed in terms of "good" and "bad" attributes
example: meat product attributes	Lean vs. fat content of meat	Willingness to choose meat framed in terms of fat or lean content	Comparison of respondents' preferences of meat framed in terms of fat and lean content
Goal framing	Consequence or implied goal of a behavior	Impact of persuasion	Comparison of rate of adoption
example: tax compliance	Vignette describing consequences of paying or not paying taxes	Tax compliance willingness	Likert-scale responses on acceptance to statements about tax behavior

As the table shows, the different modes of *framing* can be used to affect individual's risk taking propensity (risky choice framing), choice between options (attribute framing) or willingness to adapt single option (goal framing). Each mode of *framing* is characterised by different approaches in academic research. Although exceptions exist, some modes of *framing* are more commonly used in the context of certain decision problems than others. For example, risky choice framing is usually experimented in the context of the ADP. Attribute framing is normally experimented on product attributes and goal framing is most commonly researched in the contexts of medical decision making, propensity to undertake different treatment options or in comparing the effects of different brochures or pamphlets on the respondents' decision making. The following chapters provide more detailed review on each of the three modes of *framing*.

3.3.1 Risky choice framing

The social experiments conducted by Kahneman & Tversky have created several research articles based on the Asian disease problem. The academic research in risky choice framing follows closely the methodology of the original Asian disease problem and the typical applications of risky choice framing research include variations of the ADP. One of these variations is the gambling design, where the respondents are asked to choose between a risk free gain and riskier but more highly rewarding lottery. In terms of expected value, both options are the same. Other conversions, such as replicating the original ADP study and replacing the Asian disease with AIDS have also been conducted (Miller & Fagley, 1991). According to meta analysis by Pinon et al. (2005) risky choice framing is the most researched among the three modes of *framing*. 57.6 % of the articles included in the meta analysis studied risky choice framing. Pinon & Gambarara (2005) also found that student samples were common and that tasks related to product choices yielded the biggest effect sizes. Pinon et al. (2005) confirmed the results of Levin et al. (1998) by stating that the original ADP setting was the most frequently used research setting when risky choice framing was researched.

All the research settings for risky choice framing are characterised by choice and risk. The effect of risky choice framing is normally measured by comparing the responses of people choosing between the risky option and the risk-free option in both positive and negative frame settings. Figure 3-1 illustrates the setting of risky choice framing.

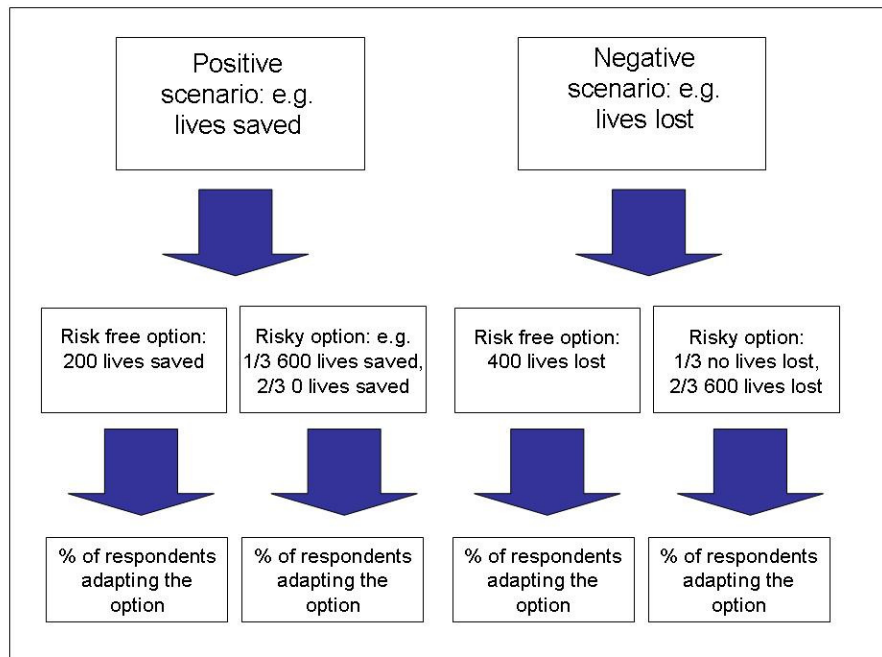


Figure 3-1: Risky choice framing

As discussed, the academic research results on the *framing* effect for risky choice framing are not unified. Levin et al. (1998) found that the more the empirical setting resembles that of the ADP, the more evident is the *framing* effect. This finding was also shared by Kuhberger's (1998) meta analysis. In addition, Levin et al. (1998) argue that the cause of the risky choice framing effect is hard to pinpoint given the fact that both the elements of risk and choice are included. Elements that affect choice beside risk are option evaluation and option comparison (Levin et al. 1998). According to their analysis, most of the academic articles on risky choice framing indicate choice reversals or choice shifts when the test subjects are primed by using risky choice framing. Choice reversal was originally defined by Kahneman & Tversky (1979) as the phenomena that was indicated by the Asian decease problem, namely that people tend to take more risks when they are presented with a risky choice option. Choice shift differs from choice reversal in terms of the difference of changes in preferences between the risky and the risk free options. In the case of choice shift, the proportion of risky and risk free options in the positive and negative scenarios is also different, but the preferences for the two options in each scenario should not be significantly greater than 0.5 (Levin et al. 1998).

More careful analysis of the article by Levin et al. (1998) reveals that of the total 29 examined articles choice reversal was detected in 13 articles and choice shift in 20 articles. Most of the articles included various empirical settings and in some articles the framing effect varied

between choice reversal, choice shift and no framing effect depending on the task assigned to the test subjects. Because of this, same article could contain both indication and no indication of framing effect. Only two articles presented in the meta analysis indicated no framing effect on any of the experiments (Kruger, 1986; Fagley & Miller, 1987). In the article by Kruger (1986) the subjects were school psychologists, i.e. experts on the primed topic. The latter article by Fagley & Miller (1987) was from the medical domain where no framing effect was detected when the subjects were asked to justify their choice for choosing between different cancer treatment scenarios.

Pinon & Gambarara (2005) identified the risky choice framing effect as the most effective framing mode. The identification was made by calculating Cohen's *d* for the effect size. In general terms, Cohen's *d* is used to measure the difference between two means and hence in the case of *framing*, tells about the mean difference between responses to the positive frame and negative frame. Also Kuhberger (1998) used Cohen's *d* in his meta analysis to measure effect size. The bigger Cohen's *d*, the bigger is the effect size. When using Cohen's *d* to measure effect size it is important to remember that the measure tells nothing about the variance of the effect size. In other words, some articles in risky choice framing might have significantly bigger framing effect than others. In Pinon's & Gambarara's meta analysis, the mean weighted Cohen's *d* by reciprocal of variance was 0,437 for risky choice framing and 0,260 and 0,444 for attribute and goal framing respectively. Both articles used various methods, such as test statistics, proportions and frequencies to calculate the two means needed for Cohen's *d*.

3.3.2 Attribute framing

Attribute framing is about *framing* the individual with attributes. A well-know research example of attribute framing was written about how consumers reacted to a stake framed to include either 80% lean meat or 20% fat (Donovan & Jalleh, 1999). After being introduced the *priming* material, the consumers are asked how appealing they view the presented meat products. In attribute framing, the framed target is defined with both positive and negative attributes while making sure that the absolute nature of the framed object is not affected by the negative or positive *framing*, (i.e. meat being 80% lean vs. 20% fat). According to the researchers it is important that the positive and negative frames are both seen as "neutral" by the test subjects to isolate the attribute framing effect. Another example of attribute framing is

to communicate the attribute in terms of success or failure rates. Attribute framing has been researched in various contexts, such as in terms of product attributes of toasters and communicating treatment options in terms of survival and death rate, to name but a few examples (Levin & al, 1998).

Academic research in attribute framing has measured the framing effect by asking the respondents to rank their preferences between multiple options or simply by indicating their preference of two options (Levin et al. 1998). Attribute framing differs from risky choice framing in the sense that the choice alternatives both represent one, single option from two different viewpoints. In other words, in the context of Donovan’s and Jalleh’s (1999) research, the respondent is only evaluating their appeal towards one meat product (80% lean vs. 20% fat). In risky choice framing, the two options differ in terms of the risk element. An important distinction is also how researchers explain the *framing* phenomena. In the case of risky choice framing the framing effect is believed to be the reason of changing risk appetite. In the case of attribute framing, the positive associations triggered by the stimuli are seen as the reason for the framing effect (Levin et al. 1998). Figure 3-2 illustrates the idea of attribute framing.

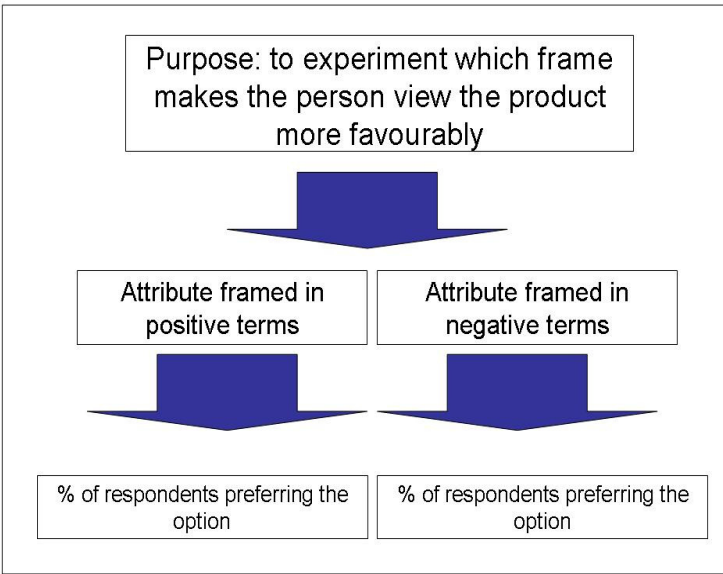


Figure 3-2: Attribute framing

According to Levin et al. (1998) and Pinon & Gambarara (1995), as the result of attribute framing, the respondents tend to rate more favourably the option framed in positive terms. In their meta analysis, Levin et al. (1998) found no evidence of research results where the effect would be reversed. However, based on their extensive literature review, Levin et al. (1998)

conclude that attribute framing effect is weaker when the research domain is close to the personal values or opinions of the respondents, such as abortion. In addition, the attribute framing effect becomes negligible when the effect is measured in terms of how the respondents actual behaviour of the respondents after the *framing* situation, instead of analyzing the respondents' self reports during the experiment.

In their meta analysis, Levin et al. (1998) examined 38 articles on attribute framing. Of the 38 articles, only two did not contain any signs of *framing* effect in any of the experiments done in the articles. In both of the articles the research focused on the subject's assessments on the number of right and wrong answers. Meta analysis by Pinon & Gambarara (2005) reveals that the effect size was the smallest for attribute framing (weighted $d=0,260$). As with the risky choice framing, student samples were again dominating the research. However, unlike in risky choice framing, the effect size was bigger with target samples ($d=0,45$) as opposed to student samples ($d=0,22$) The most researched topics were in economic and social domains.

3.3.3 Goal framing

Goal framing differs from attribute framing in terms of the aim of the *framing*. In goal framing, the subject is framed by using gain-framed and loss-framed wordings to make the subject's opinion more favourable towards the framed option. The option can be e.g. a treatment method, or a preventive behaviour. Goal framing tries to answer the question how a person should be persuaded, while attribute framing tries to answer the question how framing a single attribute affects how respondents view the target of the attribute.

For example, goal framing effect can be studied by showing people leaflets describing the benefits paying taxes. One of the leaflets is framed in positive terms, i.e. telling the target group about the benefits gained when paying taxes. The second leaflet is framed in negative terms, i.e. telling the person of the benefits lost when not paying taxes. In this case, the goal framing effect is observed by comparing the willingness to pay taxes after the subjects have been exposed to the gain- and loss- framed leaflets. Retaining the valence-consistence of the message is crucial to isolate the goal framing effect. In both cases, the contents of the message must be exactly the same. This is called same consequence framing and is further elaborated in Chapter 5. Figure 3-3 illustrates the concept of goal framing.

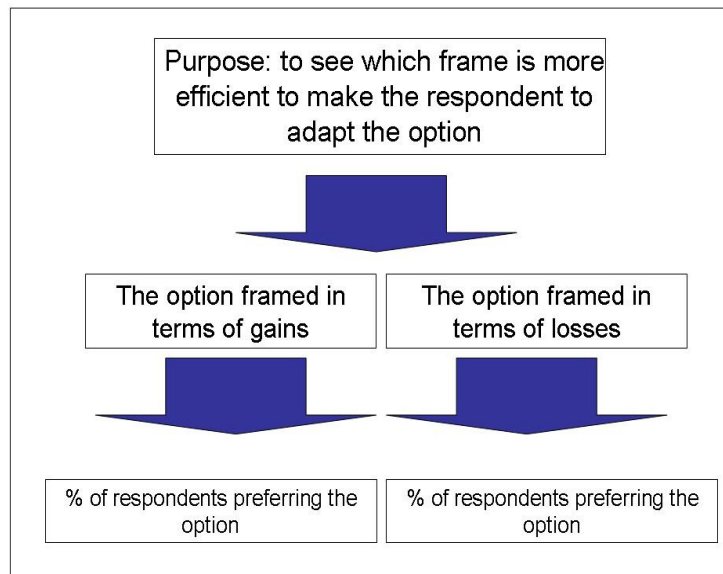


Figure 3-3: Goal framing

As Figure 3-3 shows, the *framing* effect can be e.g. measured by the differences in percentages of respondents deciding to prefer reporting all their taxable income as opposed to not reporting all their taxable income. For example, Hasseldine et al. (2003) studied the effect of goal framing by asking the respondents to rate their willingness to report all their income honestly by using several Likert-scale statements to measure the respondents' attitudes to tax compliance after being exposed to either gain-framed or loss-framed vignette on tax compliance. In their meta analysis, Levin et al. (1998) analysed a total of 28 articles in goal framing and found 14 articles, where loss-frame had stronger effect in persuading behaviour. Eight articles showed some kind of interactions when frames were changed and six articles with no framing effect. Again, the articles showed overlapping results since some of the articles included more than one research setting.

From all the three modes of *framing* established by (Levin et al. 1998), goal framing has received significantly less attention than risky choice framing in terms of published articles. Pinon & Gambarara (2005) analyzed total 151 articles on *framing*. Of these articles 87 focused on risky choice framing, 30 on attribute framing and 34 on goal framing. The same trend can also be observed from Kuhberger's (1998) meta analysis, where total 230 articles were under review. Of the 230 articles, 80 were related to the ADP problem and only 46 on message compliance (13), bargaining (14) and tax evasion (9).

Table 3-2: Samples used in goal framing research (Pinon & Gambara 2005)

Participants	k	d	95 %
Students	17	0.42	[0,31; 0,53]
Other	13	0.50	[0,36; 0,63]
Mixed	4	0.36	[0,04; 0,67]

Table 3-2 shows that students were the most used group in academic articles on goal framing. However, compared to risky choice framing and attribute framing, the portion of articles that used other than student samples, the ratio was highest for goal framing. Only four articles used mixed samples. Almost all of the academic research in goal framing has been made on individual respondents (Pinon & Gambara, 2005). This means that goal framing effect has not been researched from the point of view how the *framing* can affect and direct actions of groups. Based on the meta analysis by Pinon & Gambara (2005) most research has been made in the domains of psychology (30) and economics (10).

Concerning goal framing both Kuhberger (1998) and Pinon & Gambara (2005) use similar categorization. Pinon & Gambara (2005) have identified the following problem domains: Asian, Gambling, Product, Tax, Clinical, Message, Investment, Dilemma, Evaluation and other. Kuhberger (1998) used the following categorization: Asian disease, Gambling, Tax evasion, Bargaining, Escalation of commitment, Game theory, Clinical reasoning, Evaluation of objects and Other. Despite the fact that these categories seem similar, it is impossible to say whether the researchers have actually followed the same principles in categorizing research articles into the problem domains. For example, Pinon & Gambara (2005) provide no clear definitions for their chosen categories, while Kuhberger (1998) gives distinctive explanations on each category. The Tax evasion and Tax –domains can in fact, depending on the definition, contain articles in attribute framing and goal framing. For example, Hasseldine et al. (2003) researched willingness to report all income to tax officials by using goal framing, while Chang et al. (1987) examined tax payer’s attitudes towards audit risk by framing tax refunds as a loss or as a reduced gain. The fact that researchers have used different categorizations makes the analysis of goal framing more challenging.

As was previously stated, it seems that the goal framing effect is less dominant than the risky choice framing effect. As discussed, Levin et al. (2002) found no statistically significant framing effect for goal framing, while statistically significant effects were found for risky

choice framing and attribute framing. Of course, one reason for these results might be the small number of published articles on goal framing and the inherent variance in the goal framing effect between research designs. Despite the results of the meta analyses, individual academic articles have succeeded in providing evidence of the goal framing effect. For example Ganzach & Karsahi (1995) showed that credit card holders' are more affected by loss-framed messages than gain-framed messages.

3.3.4 *Effect analysis on the three modes of framing*

Based on the previous chapters it appears that framing effect can be identified to exist for all three modes of *framing*. Still, it is important to acknowledge that the published academic research articles might contain bias due to possible Type 1 error of the "false positive". In other words, only articles that succeed in showing the framing effect get published (Kuhberger, 1998). In their meta analyses, Pinon & Gambarara (2005), Kuhberger (1998) and Levin et al. (1998) succeeded in finding evidence of the existence of framing effect. However, according to the meta analyses, the framing effect was not equally strong between the different framing modes. Based on the categorization and analysis of Levin et al. (1998) the strongest framing effect in terms of choice reversal and choice shift could be identified for risky choice framing, i.e. decision problems resembling the original ADP problem. The meta analysis from Kuhberger (1998) supports this finding. However, the meta analysis performed by Pinon & Gambarara (2005) shows the biggest effect size for goal framing (weighted Cohen's $d=0,444$). Corresponding values for risky choice framing and attribute framing were found to be 0,437 and 0,260 respectively. Pinon & Gambarara (2005) refer to the overall effect sizes as "small or moderate".

The effect sizes measured by Kuhberger (1998) and Pinon & Gambarara (2005) cannot be fully compared given by the different categorization used by the researchers. Kuhberger (2005) divided the research in *framing* into ten categories based on the research domain, such ADP, gambling and game theory. The effect sizes were further divided two categories for each domain based whether reference point effect or labelling effect size was measured. However, Kuhberger's (1998) defined characteristics for message compliance design, bargaining design and tax evasion design have strong similarities with the goal framing mode. The risky choice framing is referred to by Kuhberger (1998) as the ADP. Based on Kuhberger's categorization, designs closest to attribute framing are tax evasion and clinical reasoning.

By using this approach, Kuhberger’s meta analysis shows almost similar effect sizes for risky choice framing when compared with the meta analysis by Pinon & Gambarara (2005). However, strong differences can be found in the effect size of attribute framing and goal framing. In meta analysis from Levin et al. (1998) indication of framing effect was found in almost every article. Concerning the independence of the framing effects, Levin et al. (2002) performed a between subjects analysis on all three modes of *framing* to eliminate possible sample bias. The researchers found only weak correlations between the framing effects concerning the three modes of *framing*. In other words, according to the research, the actual causes of the framing effect seem to be distinct for each framing mode. Levin et al. (2002) also found that in terms of variations in test subject’s preferences the framing effect was the strongest for risky choice framing with 1,09 difference between the averages of responses between the negative and positive condition. The corresponding effect for attribute framing was 0,63 while the effect for goal framing was nonexistent.

Table 3-3: Synthesis on the effect sizes for the three modes of framing

Author	Framing mode		
	risky choice framing	attribute framing	goal framing
Kuhberger (1998)	ADP: d=0,60 [+0,56; +0,64]*	Clinical reasoning: d=0,62 [+0,49; +0,75]*	Message compliance: d=0 [n/a; n/a]* Bargaining: d=0,17 [+0,07; +0,27]* Tax evasion: d=0,42 [+0,32; +0,53]*
Pinon & Gambarara (2005)	d=0,437 [+0,39; +0,48]*	d=0,260 [+0,18; +0,34]*	d=0,444 [+0,36; +0,53]*
Levin et al. (1998)	strongest framing effect: 29 examined articles; choice reversal in 13 articles and choice shift in 20 articles, 2 articles with no effect	38 examined articles: valence consistent shift in 36 articles and 2 articles with no effect	28 examined articles; 14 articles, where loss-frame had stronger effect in persuading behaviour; 8 articles showed frame interactions; 6 articles with no <i>framing</i> effect.

* 95% confidence interval for effect size, Cohen’s d used

Table 3-3 synthesizes the results of the three meta analytic articles. It is clearly evident that based on these analyses, no conclusions can be drawn regarding the actual effect sizes of the three framing modes or on the relative effectiveness of each framing mode other than that the risky choice framing is clearly the most researched framing mode. This result can easily be

justified given the existence of numerous research settings and variables that make establishing coherence in the research results difficult. To give the reader deeper understanding on the topic of the thesis and to provide further understanding on the background of the empirical experiment, Chapter 4 provides more detailed literature review on goal framing and on the variables that have been researched to influence the goal framing effect size.

4 Academic research in psychological goal framing

The purpose of this chapter is to provide literature review on the academic research in goal framing. In relation to the empirical experiment, Chapter 4.1 introduces how goal framing is used in advertisements to promote products and services. More specifically, Chapter 4.2 provides a categorization on the relevant goal framing literature in terms of the variables that have shown to affect the goal framing effect size. The effect of the variables is examined from the viewpoint of the empirical experiment with the aim of providing new knowledge to goal framing research.

4.1 Goal framing in promoting products and services

Goal framing can be an effective tool to communicate promotion of products and services. For example beach goers' propensity to acquire sunscreen lotion can be affected by using goal framing techniques. Rothman et al. (1999) found that beach goers who were exposed to brochures framed in terms of losses were more likely to use their free coupon to redeem sunscreen. Although the article did not find out how the goal framing would affect actual purchasing behaviour, it is fair to assume that the willingness to acquire the product would transfer at least partially to purchasing behaviour.

Several categories of products and services could be promoted by using either gain-framed messages or loss-framed messages. Naturally, using loss-framed messages could be more natural to companies offering e.g. insurance services, antivirus services or other products or services designed to protect or cover material or immaterial assets. Although lots of academic research exists on framing, research on the applicability of framing for real marketing purposes (as opposed to hypothetical) is limited (Kuhberger, 1998; Pinon & Gambarara, 2005; Levin et al.1998). In relation to marketing, the effect of framing has been studied in the contexts of bargaining (Bazerman et al. 1985; Arkes & Blumer, 1985), perceiving sunk costs (Arkes, 1985) and negotiation and willingness to pay under risk (Casey & Delquie, 1995).

Pervan & Vocino (2008) took a more practical approach by examining how magazine advertisers use *framing*. The purpose of the article was to find out how much *framing* is used,

which mode of *framing* is the most common in magazine advertisements and what are the perceived effects of *framing*. The research revealed that 92,1 % of all the advertisements made by profit organizations covered by the sample contain *framing*. Only 7,4 % of the advertisements were primed by using only goal framing technique. However, 40,3% of the advertisements used both goal framing and attribute framing techniques. Almost exclusively, the advertisements where goal framing was used were framed in terms of obtaining gains (gain-frames). The researchers justified the result by arguing that advertisements where all the statements are framed in terms of losses might appear too negative to the receivers. (Pervan & Vocino, 2008)

In the context of the empirical experiment of the thesis, all the statements in the loss-framed text version were inverted by using negative wordings. Because of this, the text might have seemed to be too negative and unnatural for some of the respondents. Two respondents even indicated that the negative wordings made the text difficult to follow and unclear. Results of the empirical experiment are further discussed in Chapter 6.

4.2 Variables of goal framing effect

Chapter 4.2 provides categorization on the variables that have been researched on as possible candidates to explain the goal framing effect. The chapter also forms the basis for the empirical research part of the thesis by introducing the variables that could possibly explain the results of the goal framing experiment made on the IT-professionals and students.

As discussed, the most common result in articles that have succeeded in showing effects in goal framing is that message framed in terms of losses is more efficient in convincing respondents to adapt the idea of the message (Levin et al. 1998). For example Banks et al. (1995) showed that females who were shown a loss-framed message on getting a mammography as a means of early detection of breast cancer did in fact participate more frequently to mammography than females who were shown similar gain-framed message. However, Rothman & Salovey (1997) provide another dimension to goal framing by further specifying that in articles where prevention behaviours (such as using sunscreen) are researched, gain-framed messages have stronger effect on preferences. In other words, respondents' preference to accept treatment was stronger when framed in terms of gains. When detection behaviours were researched (such as getting a mammogram), the researchers

found that loss-framed messages were more efficient to motivate behaviour. In addition to individual perception, also other potential variables that can affect the goal framing effect size have been identified in academic research.

Research has been made to further explain what could be the role of the variables concerning the goal framing effect. So far, meta-analytical studies have not been able to find systematical and significant cause-effect relationships or even correlations on how the different variables such as gender, participants or research domain affect the goal framing effect size. Despite this result, efforts have been made to address the issue. Academic research on goal framing has found several variables that can explain the existence or non-existence of the goal framing effect. In accordance with the initial hypothesis, the empirical part of the thesis starting from Chapter 5 focuses on analyzing whether the variables introduced in this chapter explain the results of the empirical experiment of the thesis. As previously discussed, the framing mode is one of the variables that seem to affect the variability of research results when different kinds of stimuli are used to frame test subjects. However, the categorization of the three modes of framing by Levin et al. (1998) fails to consider the differences within a particular framing mode. For example, within goal framing research plenty of variance exists in the research results of different academic articles. Although most articles that have succeeded to differences in responses between the loss-framed and gain-framed messages, there exists articles where the goal framing effect was not evident (Levin et al. 1998).

According to the original definition by Kahneman and Tversky (1979), the framing effect emerges from both the formulation of the problem and the individual's personal habits and characteristics. This means that even if the categorization into the three modes of framing would be fully exhaustive and mutually exclusive, it could at best only partially explain research results. After this, the measurement of individual's personal habits and characteristics comes into effect. Naturally, the effects of demographic factors on the goal framing effect are simple to observe and measure. Pinon & Gambarara (2005) refer to these as "higher order moderator variables" including gender, sample type (target sample/student sample), experimental design (within subjects/between subjects) and unit of analysis (individual/group). Relevant context variable included study source, which refers to the source of the academic article (e.g. economics/psychology). In addition to these variables, the academic research has identified variance within the individual modes of framing based on the research design. In other words, although the article fits well into one of the three modes

of framing, the research design can add additional factors that cause variance in the results. Pinon & Gambarara (2005) identified these factors as: number of options (single choice/multiple choice), response mode (choice/judgement) and research domain (e.g. economic, social, health). Within this context and based on the research design, the empirical experiment of the thesis can be categorized as a goal framing experiment measuring multiple choice responses on judgement in the economic research domain. The experiment is implemented as a between-subject study focusing on the individual unit of analysis. The experiment uses a mixed sample of students and target sample (IT-professionals). (Pinon & Gambarara, 2005)

Despite the fact that Pinon & Gambarara (2005) have analyzed the individual effects of the above-mentioned variables, it is challenging for the current literature to show how different combinations of these variables affect the research results within the goal framing mode. Since *framing* is a psychological phenomenon, the subjectivity to goal framing is also dependent on the individual. Mahoney et al. (2010) have researched how individuals' cognitive capabilities affect subjectivity to *framing* and Levin et al. (2002) have researched goal framing from the point of view of individual personality traits with the objective of trying to expose the personality types that are more subjective to goal framing.

Based on the above discussion, the academic research shows that the results of goal framing are dependent on both the problem construction and on individual differences. The following chapters provide a literature review on the variables which have been studied in academic articles and which are relevant in the context of the empirical experiment of the thesis. The chosen variables are: gender, level of involvement, individual differences, information amount and hypothetical vs. real framing situation.

4.2.1 Gender

Several researchers have included respondents' gender into their analysis (Kuhberger, 1998; Hasseldine & Hite, 2003; Wang & al 2001). Meta analysis on framing research suggests that differences between genders have not been tested systematically in previous academic research (Kuhberger, 1998). Although Pinon & Gambarara (2005) and Kuhberger (1998) did not incorporate gender into their respective meta analyses, individual research articles have focused how gender affects the framing effect in individual empirical designs. Concerning

goal framing, significant evidence does not exist that gender would influence the goal framing effect size (Pinon & Gambarara, 2005; Rothman et al. 1999; Levin et al. 2002).

As discussed previously, some differences in the framing effect between genders can be explained by referring to the general personality differences between men and women. As was briefly discussed in Chapter 1, Fagley (2010) showed in a risky choice framing study that women were more affected by *framing* than men. The researchers found statistically significant results on all the experiments conducted. The main thesis of the researchers was that since women are considered to be more affectionate than men and are able to consider situations from multiple perspectives, they can be more easily attached to the framing condition. This view was proven by gaining similar results on men only after further *framing* them by asking them to think if the framing scenario would happen in their local community.

Assuming that the framing mode would fully cover the variability of research results between different experimental designs would suggest that since the research was done on risky choice framing, the results would not be applicable to goal framing designs. Huang & Wang (2009) came to similar conclusion when the researchers used all three framing modes to construct a within-subject design to measure the effect of gender on the framing effect. When compared with other modes of framing, the goal framing design showed variation in results between genders in different task domains. The overall result showed that the gender effect was not consistent between the three types of framing and the task domain (i.e. life-death, money, time). Despite these inconsistencies, the study found out that in the case of goal framing, the money domain showed no framing effect for either gender. In the time domain, females reacted more strongly to loss-framed message, while men reacted more strongly to gain-framed message. In addition, some studies have consciously disregarded gender from results analysis given its statistical insignificance to research results (Krishnamurthy & Blair 2001; Mahoney et al. 2010). As a summary, based on this review, the academic literature on *framing* has not been able to show consistent gender effects between the three modes of framing and the task domains.

4.2.2 Level of involvement

Donovan & Jalleh (1999) experimented whether level of involvement of individuals would explain variation in the framing effect. The researchers replicated the original attribute

framing experiment by Levin (1987) and found out that respondent's who indicated food fat content being important to them systematically ranked lower both the product labels (25% fat vs. 75% lean). When comparison was made between the labels, the researchers found that the 25% label created weaker framing effect among the low-involvement respondents as opposed to the respondents who stressed the importance of low-fat content (high-involvement respondents). The researchers explained the deviation on comments from the respondents saying the 25% label directs thinking specifically towards the fat content, i.e. towards the high-involvement respondents. The corresponding effect was not found on the 75% label. (Donovan & Jalleh, 1999)

The research conducted by Donovan & Jalleh (1999) focused on the effect of involvement only for the attribute framing mode and within the domain of simple product choice. Khrisnamurthy et al. (2001) provided extension to the effect of involvement in *framing* by experimenting on both attribute framing and goal framing within the domain of health decisions. The researchers primed respondents with different versions of pamphlets promoting treatment options. Students were used as low-involvement subjects while patients were used as high-involvement subjects. Donovan & Jalleh found out concerning goal framing that the low-involvement subjects (students) were more strongly affected by information framed in terms of losses. The conclusion is in accordance with the findings of Levin on goal framing (Levin et al. 1998). No differences between students and patients were found within attribute framing (Krishnamurthy & Blair, 2001). Based on these articles, the level of involvement has proven to affect the intensity of framing effect but like gender, the effect of involvement has not shown consistent differences between the framing modes.

4.2.3 Individual differences

Although research regarding differences between individuals in *framing* exists, the results cannot be fully generalized. For example Mahoney et al. (2010) studied whether individual cognitive capabilities can affect the intensity of the *framing* effect on different individuals. The researchers used risky choice framing in a within subject study to find out whether the individual's level of risk aversion would increase the framing effect. The researchers found that risk-averse respondents were more affected by *framing* when presented with positively framed choice dilemma. In the case of negatively framed stimulus, the effect was not found. (Mahoney et al. 2010)

Mahoney et al. (2010) also studied the individual thinking styles and found that people with high-level of experimental thinking (measured using the Rational Experimental Inventory Scale) were particularly prone to the risky choice framing effect. When the researchers analyzed respondents with both high level of experimental thinking and high level of risk aversion, they found that these respondents were significantly more prone to the framing effect than other respondents.

Lauriola et al. (2005) provided further insight into how individual differences affect the framing effect. Unlike Mahoney et al. (2010) and Lauriola et al. (2005) conducted a within-subject study for all three framing modes. The results of the article provide interesting insights particularly for the goal framing mode. On goal framing, the problem domain was on the preference of healthy vs. unhealthy foods. Although the article did not find any differences in the framing effect between the gain-framed message and loss-framed message, the way the respondents ranked the appeal of the message was correlated with various measures of emotions, such as involvement, lie and beliefs against consuming high-fat foods. Negative correlation was found on the level of impulsiveness. Another article by Levin & al. (2002) examined how individual differences affect framing effect. The researchers focused on how personality traits affected the goal framing effect. The results of the between-subjects study showed in the case of goal framing that respondents with higher levels of agreeableness and conscientiousness were more likely to recommend their families to cut down the consumption of red meat.

As a summary, people who were more involved and concerned in health-related issues were also more affected by *framing*. These results have similarities with the above-described results by Donovan & Jalleh (1999) concerning level of involvement. This shows that looking for variables that affect the intensity of the framing effect in general are hard to define to be mutually exclusive. Variables related to individual differences can also be categorized in the level of involvement category. In addition, even if correlation with one variable, such as gender, is found with the intensity of framing effect, the actual cause-effect –relationship might be caused some other variable, such as level of involvement.(Levin et al. 2002)

4.2.4 Information amount

Ganzach & Schul (1995) researched on the effect of information amount on the goal framing effect and found that the more information were presented to the respondents, the stronger became the differences in preferences between the gain-framed message and loss-framed message in the between-subject study. The researchers found this result by examining changes in the students' perceptions of an electronic translator. The information amount was controlled in terms of the number of product attributes shown to the respondents. The highest buying intention by using attribute framing was observed when the maximum number of five negative product attributes was presented. For example, the accuracy of the translation device can be communicated to be either 90% accurate or 10% inaccurate. However, it is noteworthy that despite the fact that the negative frame with five attributes created the most favourable responses, the researchers did not find systematic differences in response favourability between the negative and positive frames when measured with the amount of product information presented. Although the product communicated with five negatively framed attributes evoked the most favourable responses, when the product was communicated with only one negative product attribute, the responses were the least favourable. The favourability of product attributes communicated in positive terms lay in between. (Ganzach & Schul, 1995) In comparison, Che et al. (2007) investigated the effect of information amount in the attribute framing mode by using e-commerce shoppers as subjects. The research did not show significant changes in preferences when the amount of negative information was increased, but showed that the amount of positive information increased the respondents' preferences towards the products.

4.2.5 Hypothetical vs. real framing situation

Kuhberger et al. (2002) examined whether the framing effect is dependent on the situation. In their experiment they used the risky choice framing mode, so the results are not directly applicable to goal framing. The researchers framed two situations, one with real, but modest monetary payoffs, where the respondents were rewarded based on their choices. In the hypothetical scenario the respondents were offered additional opportunity to receive large, imaginary payoffs. The researchers found no statistical difference between the hypothetical

and real choice decisions.

To measure the effect of payoff size the researchers offered some respondents big real payoffs, the exact amount as in the hypothetical payoff situation. The second result of the research was that the risky choice framing effect was bigger with the big payoffs. Whether the payoffs were hypothetical or real did not affect the risky choice framing effect. (Kuhberger et al. 2002)

4.2.6 Indications to the empirical experiment

The variables discussed in this chapter can be considered in the context of the empirical experiment. For example, the empirical experiment can provide more understanding on the effect of gender on the differences between respondents in the goal framing situation (H3). Since both students and IT-professionals are surveyed, the level of involvement might affect the results in a way that IT-professionals might be more affected by the loss-framed text on IT-outsourcing services. On the other hand, the framing effect might be stronger within students who do not have as much competence and knowledge in the topic and thus are more easily influenced.

On the other hand, based on research done by Che et al. (2007) and Ganzach & Schul (1995) information amount might play a role in the overall research results although the framing text is the same length in both versions of the questionnaire. The fact that the framing situation in the empirical experiment is hypothetical might explain to some extent the differences between the respondents to the two versions of the questionnaire.

5 Empirical research

Chapter 4 provided review on the academic literature in goal framing forming the theoretical basis for the empirical experiment. As discussed in Chapter 4, the empirical contribution of this thesis differs from previous academic literature in several ways. First of all, the experiment uses both student and target samples. Furthermore, the direct effect of goal framing on respondents' emotions has received very limited attention in academic research. This has been taken into account in the design of the survey questionnaire, which also asks the respondents to indicate their emotions after reading the text on *IT-infrastructure services*. In addition to these aspects, the purpose of the study is to provide further understanding on the effectiveness of goal framing in an experiment which is affected by the variables discussed in Chapter 4.

This chapter continues by introducing the case company and the efforts that the company sales professionals use when selling IT-outsourcing services to b2b clients. After this, the chapter progresses by elaborating on the design of the empirical experiment as well as offering more detailed introduction on the sample groups of the study.

5.1 Case company

For the research purpose, IT-professionals from an information technology company were surveyed by using online- and written versions of the questionnaire on *IT-infrastructure services*. The case company has employees with professional expertise in numerous fields related to IT-technology and services, such as: *IT-infrastructure services* and consulting. The survey is conducted on the employees of the Finnish headquarters situated in the Helsinki metropolitan area.

The case company employees use various materials in promoting their IT-infrastructure offering. Depending on the stage of the sales process different kinds of communication methods are used. Two case company IT-sales professionals were interviewed to gain additional information on the importance of written sales material. According to the sales professionals, written promotion materials similar to the priming text of the questionnaire are

mostly utilized in promotion events. The professionals then elaborate on this information in their presentations with the client. In addition, the interviewed professionals stated that the clients usually get their first impressions of a new service from magazines and journals. The IT-professionals stressed the importance of written material in the sales process, but also added that the sales process is multi dimensional and includes several faces where all forms of communication are essential. However, although discussions are important, clients usually demand written material on the side to acquire additional information on the services sold. (Interview 28.4.2011)

When the sales professionals were asked about their initial impressions about the text framed in terms of gains (A) and the text framed in terms of losses (B), both indicated that they would rather show the positive A-version to their clients. The professionals based their opinion by saying that the loss-framed text can be seen by the client as something negative and that in a selling situation, it is better to stress the positive aspects of the services. These initial impressions provide interesting standing point for the empirical experiment. (Interview 28.4.2011)

5.2 Stimulus

To achieve the desired framing effect, the respondents were exposed to a text describing the benefits of *IT-infrastructure services*. The material was compiled from the case company's publicly available marketing material in co-operation the case company professionals. The text was titled in a neutral manner: "IT-infrastructure landscape is changing". The one-page text contained a short introduction emphasizing the challenges of the competitive environment companies are facing and how *IT-infrastructure services* can address these challenges. After introduction the text was divided into the following three sub-headings:

- 1) Server consolidation & virtualization
- 2) Mobile workforce
- 3) Business continuity

Each of the sub-headings introduced some ways of how companies can benefit from *IT-infrastructure services*. For example, server consolidation & virtualization introduced the benefits of reduced number of servers. Solutions for the mobile workforce were promoted

with productivity gains and the ability to fulfil the performance demands of the business. In the business continuity-section the text introduced the reader the benefits of using proprietary analytical tools to monitor IT-environment and the possibility to avoid server downtime. The final part told the reader that by having the *IT-infrastructure services* in place, the reader can relax and is ready to face the challenges of the new market place. Furthermore the reader was told that he/she gain the first place in competition when using the proposed *IT-infrastructure services*.

To balance the understanding of the IT-professionals and students, the text was modified to only include terms and vocabulary that can be assumed to be understood by both target groups. The text was also modified to use the more personal passive voice “you”. The purpose of this was to create personality and involvement to the issues in the text for both target groups. Please see Appendix 1 for the gain-framed (A) and loss-framed (B) versions of the framing text with differences in wording highlighted.

According to Rothman & Salovey (1997) there are four structurally different ways of performing *goal framing* to a given action–outcome relationship. They are:

- (A) “take action and get gain”
- (B) “not take action and do not get gain”
- (C) “take action and avoid loss”
- (D) “not take action and incur loss”

The A–B pair constitute same consequences goal framing while the A–D pair constitute different consequences goal framing. As noted by Rothman and Salovey (1997), different consequences goal framing involve an inherent confound because they also vary the salience of desirable versus undesirable outcome. To avoid this problem, the empirical experiment was designed to be consistent with the observations of Rothman and Salovey (1997). The *framing* text was built to represent same consequences goal framing, namely the A-B pair. However, one conscious exception to this principle was made. The sentences: “*You will avoid costly outages*” (A) vs. “*You will not avoid costly outages*” (B) has an undesirable outcome, which constitute the C-D pair. This was done to maintain the original wording of the promotion text. The stimulus text was built in accordance with the same valence –principle discussed in Chapter 3.

		Outcome	
		Desirable	Undesirable
Action	Attain	A (gain frame)	D (loss frame)
	Not attain	B (loss frame)	C (gain frame)

Figure 5-1: Stimulus types (Rothman & Salovey, 1997)

Figure 5-1, adapted from Rothman & Salovey (1997) illustrates the differences between same consequences and different consequences goal framing. In the pictures, pairs A-B and C-D are according to the principle of same consequence goal framing, while pairs A-D and B-C are according to the principle of different consequences goal framing. Please see Appendices 9.1 and 9.2 for the gain-framed (A) and loss-framed (B) texts.

5.3 Questionnaire design

The empirical research was conducted by using an online questionnaire for the IT-professionals. In addition to the online-version, answers from IT-professionals were also collected by using a printed version of the online-questionnaire. Students were surveyed by handing printed questionnaires in the beginning of lectures in the selected university courses. The questionnaire had four pages. The first page contained instructions for the survey. The respondents were informed about how the answers of the survey would be used and they were informed about the opportunity to leave their contact details to participate a lottery among the respondents with the possibility to win movie tickets. The priming text about *IT-infrastructure services* was placed on the second page, after which one open question was presented. The remaining questions were closed-ended questions.

Earlier academic research on goal framing has focused on topics, such as health-related behaviours, personal taxation, credit card –usage, personal sunscreen usage and simple product or attribute appeals, to name but a few examples. The common nominator in these

types of articles is the ability to observe the answers and even behaviours of the chosen target groups on a very personal level. For example, Ganzach et al. (1995) examined goal framing in the context of credit card usage. Hasseldine et al. (2003) researched goal framing by asking subjects how they felt about evading personal taxes. The empirical research of the thesis significantly differs from these articles in the way that the decision to invest in *IT-infrastructure services* is not a decision that the test subjects are experiencing on personal level (or are familiar with), although the IT-professionals might feel more personally about the topic than students. In other words, the situation is hypothetical as opposed to real.

Another differentiating aspect in the empirical research of this thesis is the gap between self-reports and actual behavior. This gap differentiates the empirical research of the thesis for example from the research done by Banks et al. (1995), where the researchers measured the effect of goal framing on mammography utilization of women. The effect was measured by comparing the actual levels of mammography utilization 6 and 12 months after *priming* the respondents with either a positively framed or a negative framed message on mammography. Another example is the research made by Rothman et al. (1999) on sunscreen use of beach-goers. The researchers primed the selected beach-goers with different versions concerning the benefits of using sunscreen. The framing effect was measured on the actual behaviour of the test subjects of redeeming their free sample of sunscreen. Given the hypothetical situation, the empirical experiment of the thesis is not designed to measure actual behaviour but views and opinions of the respondents.

These research characteristics described above differentiate the empirical approach of the thesis from earlier academic research. Because of this, none of the research methodologies used by earlier academic research can be fully replicated to fit the purposes of the empirical research of the thesis. To measure the results of the framing effect, alternative approach was needed. The open-ended question in beginning of the questionnaire was designed to provide information on the initial perceptions that the respondents had on the text on *IT-infrastructure services*. The question was purposefully placed in the beginning of the questionnaire to prevent the possible noise caused by the proceeding closed-ended questions. The purpose of the closed-ended questions was to provide information on:

- 1) how convincing the respondents experienced the statements in the text
- 2) how the respondents experienced the benefits and the importance of each of the

services described under the sub-headings

3) how the *priming* text affected the respondents' emotions

According to the theory of interpersonal behaviour by Triandis (1977) the questionnaire was formed to measure both the cognitive and affective components of the respondents' attitudes. In other words the questions measured shifts in respondents' valence towards questions asking the respondents' views on *IT-infrastructure services*. As discussed in previous chapters, the nature of the empirical research restricts the measurement of actual behaviours. Instead, the respondent's behaviours were examined by asking their views on the mentioned *IT- infrastructure services*.

To test the respondent's views and opinions on the benefits of the *IT-infrastructure services*, the respondents were asked to rate statements on the 7-level Likert scale concerning the benefits of the *IT-infrastructure services* as well as their willingness to take risks in acquiring these services. The question 3.2 about opportunities for mobile workers was worded negatively to avoid acquiescence bias. Acquiescence bias is commonly known to affect Likert-type questionnaires that include several similar items after each other and happens when the respondents tend to indicate agreement to questions that resemble each other. To avoid the respondents adapting a pattern of response-set to the questions, the questions were categorized under sub headings. Given the fact that the questionnaire contained only limited number of questions and the questions were categorized under different sections, acquiescence bias was not considered to be an issue. Upon the analysis of the survey results, the answers to each question category had clear variability. Chapter 6.4 provides more analysis on the limitations of the research method.

To measure the respondents' emotions and to provide indication and differences on the respondent's emotions when presented with the positive (A) and negative (B) versions of the *priming* text, the questionnaire used the Hierarchy of consumer emotions -model by Laros (2005). The model is based on meta analytic study on the most used emotions that people experience in buying situations. The model includes both negative affect and positive effect emotions and omits "neutral" emotions, such as "surprise". The model was chosen based on the statistical factor analysis by Laros (2005) indicating significant factor loadings on the categories (Laros & Steenkamp, 2005). This indicates that for the most part the emotions proposed by the model are seen as unambiguous. For the purposes of the research, emotions

were chosen from the following categories of the model:

Positive affect

Happiness: optimistic & enthusiastic

Contentment: contented → satisfied

Love: not included

Pride: not included

Negative affect

Anger: frustrated

Fear: worried

Sadness: helpless

Shame: not included

Concerning positive affect, love and pride were omitted from the questionnaire based on the indicative feedback when the questionnaire was tested. Based on the same feedback, no emotions were chosen from the categories sadness and shame.

The ready questionnaire resembled to some extent the questionnaire used by Cox et al. (2001), where the researchers measured the effect of goal framing how the benefits of early-detection health treatments are communicated. Their questionnaire included e.g. the following statements “I got involved in what the ad had to say”, “This ad really made me think”, and “this ad was thought-provoking”. The authors also measured the emotional responses by asking the respondents to rate the following statement: “I felt strong emotions while reading this ad”. The statements used by the empirical research of this thesis are similar to some extent. However, the questionnaire includes more thorough method of asking the respondents’ emotions. Namely, the questionnaire drills down deeper into the emotions of the respondents by asking them to indicate how much they experienced both positive and negative feelings that have proven to have affect actual purchasing behaviour of individuals (Laros & Steenkamp, 2005). Figure 5-2 illustrates the questionnaire design.

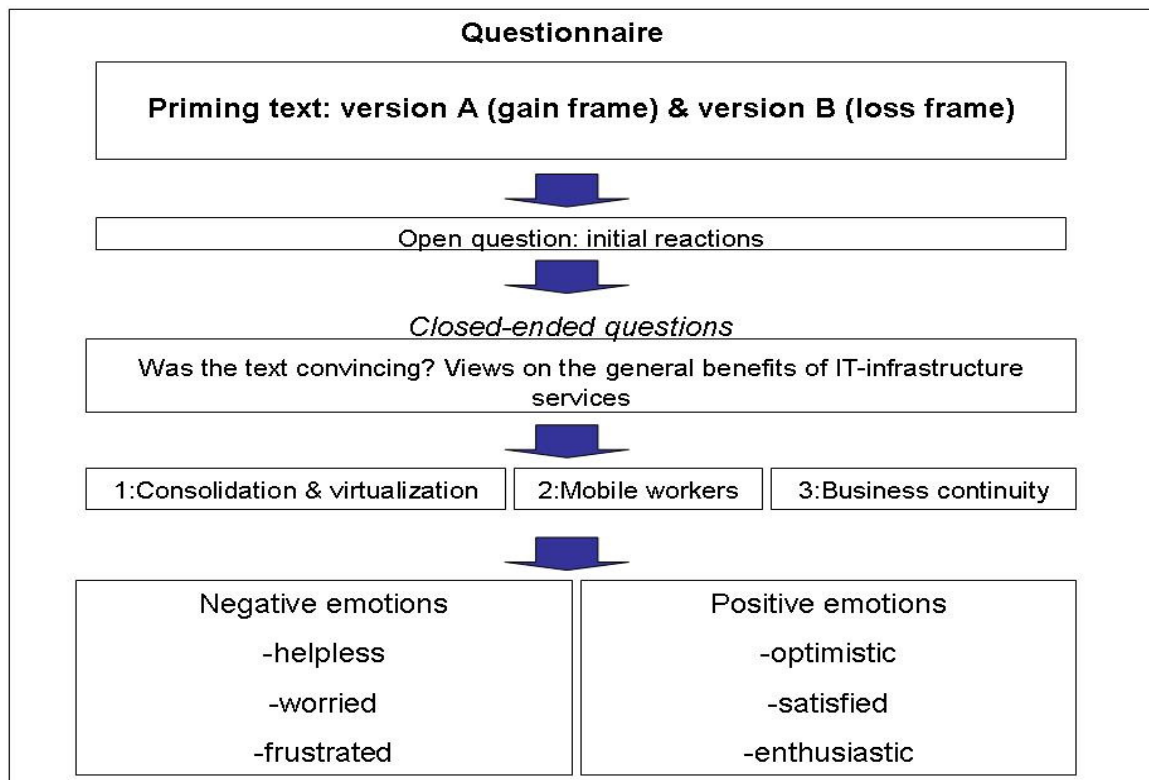


Figure 5-2: Questionnaire design

In the final part of the questionnaire, the respondents were asked about their perceived knowledge on *IT-infrastructure services*, sex, age and status. The questions were measured on a seven-point Likert scale, with explanations of each alternative on top of the question matrices. Balanced questions on Likert scale were used in the questionnaire to avoid consistent answering biases. In order not to confuse respondents, the Likert scale was exactly the same in all the questions, except in the questions measuring emotions and demographic information on the respondents. Although a full consensus does not exist on the correct Likert scaling, generally a scale containing 7-9 levels is accepted in social research (Pimentel, 2010). Researchers are not unified in whether midpoint should be included to a Likert-type questionnaire (Kahn et al. 2011). Midpoint was selected for the questionnaire to allow respondents to choose the neutral option and to avoid acquiescence bias (Pimentel, 2010). The questionnaire and the *priming* text were first tested on selected students (N=10). After the initial testing, the questionnaire was modified based on the feedback. Some of the questions were modified to be clearer and some of the professional terms used in the *framing* text were altered to be more understandable for students. Some aspects from the questionnaire were removed given that they were not applicable for the purposes of the research. The questionnaire can be found in Appendix 6.3.

5.4 Measurement

The Likert-scale provides suitable measurement scale for the research, since it is well-suited to measure attitudes. In addition to ordinal-scale data, Likert-scale data can also be treated as interval-scale data. However, to do this the Likert-levels “have to correspond to differences in the trait on the natural variable” (Goldstein & Hersen, 1984). Pimentel (2010) confirms this view by stating that the data can be treated on interval scale given that the respondent’s experience the same distance between all the answer alternatives and/or of the item is visualized on analog scale. In addition, according to Pimentel (2010) it is possible to sum up individual Likert-items on similar scale and treat the data on interval scale given that the scale used for the individual items is a credible approximation of an interval scale. Although, consensus exists that the usage of either category is possible, using interval scale on ordinal data is subject to discussion and caution (Pimentel, 2010; Goldstein & Hersen, 1984; McCall, 2001).

The quality of the data affects the statistical methods available in the analysis phase. In measuring the results, the data collected from the survey was treated as ordinal scale data given the fact that when measuring attitudes, the distance between the levels can not be treated as constant. On each of the latent variables, order can be achieved among the population. Except for the open question and the questions measuring sample demographics (sex, age, student/professional –status), the questions were measured on Likert-scale. Because of the nature of the survey data and the choice of the question types, the data received from the questionnaire is qualitative and discrete. These characteristics define the suitable analysis techniques for the survey data. The thesis analyzes the question answers as ordinal data and analyzes each question individually by using the Kruskal-Wallis test although summed results are also provided.

Before the data analysis, the question items were first coded into numerical values except for the open question 1. Please see Appendix 4 for the numbers assigned to the different response alternatives. After coding, the data was analysed with SPSS data analysis software. In addition to combined analysis, individual analysis was performed on both IT-professionals and students to provide indication on the framing effect among the two groups and between the groups respectively. Figure 5-3 shows the statistical techniques used to analyze the questionnaire data.

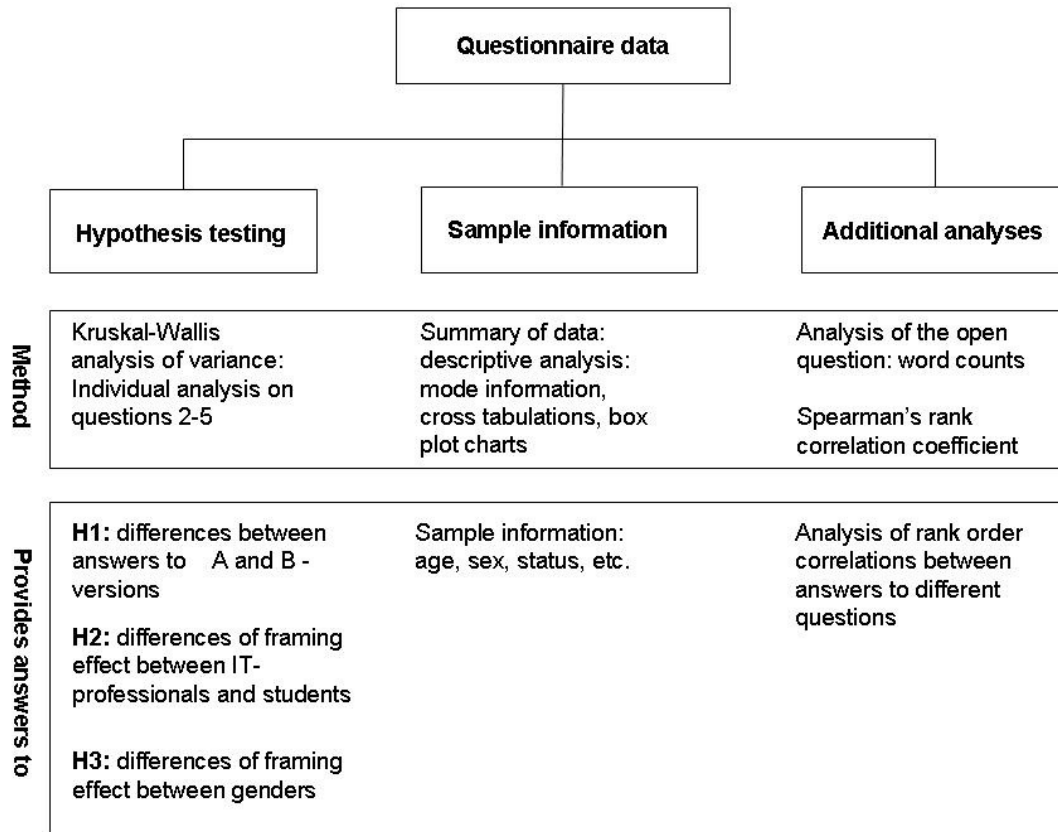


Figure 5-3: Summary of data analysis

To test the research hypothesis H1, the existence of the framing effect among all the respondents, Kruskal-Wallis one way analysis of variance was conducted for both IT-professionals –group and student group individually and combined (H2). The analysis was conducted on each question separately. Concerning H3, differences in the framing effect between genders, similar analysis was done on both groups individually and combined with gender as grouping variable. Descriptive analysis was done on both groups individually concerning questions on age, gender and self-reported level of information *on IT-infrastructure services*.

The answers of the open question were analyzed by finding out whether particular words were used more often or whether positive or negative wordings were used or whether the answers stressed risks/threats or opportunities of *IT-infrastructure services*. Based on initial review of the answers to the open question, the following words repeated in the answers: time savings, cost savings, revenue, profit, efficiency, flexibility and communication. To measure whether the respondents used the priming text in their responses, the words virtualization,

consolidation, mobile and continuity were also searched among the written answers. The analysis was done on Excel and the answers were cross-tabulated based on the questionnaire version (A or B) and gender. To provide additional information, the frequency of the chosen words was also tabulated against status and mindset. The frequency of each searched word was only recorded once to indicate that a particular answer contained the searched word one or more times. Finally, Spearman’s rank correlation coefficient was used to provide additional insight into what kinds of interactions exist between responses to different questions.

5.5 Participants & selection procedures

To test the goal framing effect between the case company IT-professionals and students, a between-subjects design was constructed. By *priming* the two different groups, the purpose of the empirical study is to find out whether the goal framing effect is weaker among IT-professionals who (in general) have more experience in IT-outsourcing services than students. In other words, the purpose of choosing the two groups is to find out whether hypothesis H1 and H2 hold, namely, to find out if the framing effect exists for IT-professionals and students as a combined group and whether differences exist in the framing effect size between these two groups. Figure 5-4 summarizes the sampling & selection procedures:

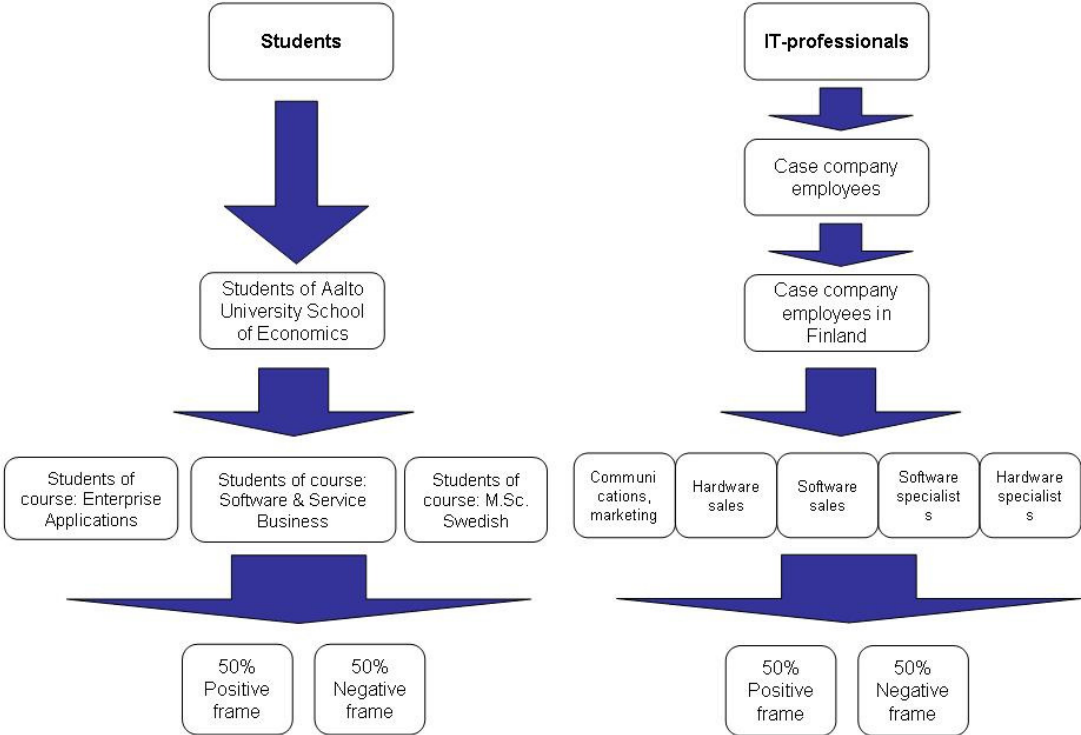


Figure 5-4: Sampling procedure

5.5.1 IT-professionals

For the research purposes, IT-professionals were selected among the employees of the case company. Participants who were selected for the survey were at the time of the survey situated in the Finnish headquarters. Participants from the various business units of the case company were sent the questionnaire. The participants were randomly assigned to receive either the positively framed version (A) or the negatively framed version (B) of the questionnaire so that 50% of the IT-professionals received A-version and 50% B -version.

The survey was sent to 120 IT-professionals. IT-professionals working within the following business areas were chosen: IT-outsourcing sales, software specialists, hardware specialists and marketing & communications. The respondents had varying level of expertise in matters related to IT-outsourcing. For the IT-professionals the survey was first done by using a web-based survey tool. To increase the response rate, the questionnaire was later distributed in paper form (same method as for students) to the respondents who did not answer the online survey. As a reward, the respondents were offered a chance to participate a lottery among the respondents with the possibility of winning movie tickets.

Table 5-1: IT-professionals who answered the survey

	<i>Total</i>	<i>Man</i>	<i>Woman</i>
Version A	12	8	4
Version B	10	6	4
TOTAL	22	14	8

As Table 5-1 shows, the response rate of the IT-professionals was low despite the repeated reminders to answer the online questionnaire and the paper versions of the questionnaire that were handed out to increase the response rate. Naturally, the smaller set of responses decreases the reliability of the sample.

Table 5-2: IT-professionals' age distribution

Age	Frequency	Percent
20-30	4	9,1
30-40	8	18,2
40-50	3	6,8
50-60	7	15,9
Total	22	50,0

Table 5-2 shows the age distribution of the IT-professionals who answered the survey. As the table shows, the participants were from various age groups. Naturally, the age distribution is bigger in the IT-professionals' sample than in the student sample.

Among the IT-professionals, male respondents did not report themselves notably as more or less business minded than female respondents. However, it is important to remember that the sample of IT-professionals was smaller in size than the student sample. In addition, the IT-professionals' answers on their level of competence in offering advice on *IT-infrastructure services* were not dependent on their age. Most of the respondents saw that they are competent in offering advice on *IT-infrastructure services*. Please see Appendix 2 for additional information on the IT-professionals.

5.5.2 Students

To answer research hypothesis H1 and H2 students of Aalto University School of Economics were used as the student sample to be compared against the case company IT-professionals in terms of the strength of the goal framing effect. More specifically, students participating courses in information systems science were selected (42 responses). To provide additional insight, students participating M.Sc. –level course in Swedish were also included (8 responses). Since most of the students participating these three courses are majoring in topics related to business and economics, the student sample contained more business-minded than technology-minded students (see research results). Since the students participating the two first courses can include courses in information systems science as a part of their major studies or minor studies, it is highly probable that the sample includes students with backgrounds in various business-related topics. The first course, Enterprise applications, is included in the B.Sc. program of Business technology (25 responses). The second course,

Software & service business (17 responses) is included in the M.Sc. program in Information and service management. To add the representativeness of the sample, students participating M.Sc. –level course in Swedish were also included (8 responses). 50 Students answered the survey. Of these students 35 were men and 13 women. Two respondents did not indicate their gender. For convenience reasons, the questionnaire was implemented in paper form instead of as an online questionnaire. The students filled in the questionnaire in the beginning of lectures. Please see appendices for additional information on the student sample.

Table 5-3: Students who answered the survey

	<i>Total</i>	<i>Man</i>	<i>Woman</i>	<i>n/a</i>
Version A	25	19	5	1
Version B	25	16	8	1
TOTAL	50	35	13	2

Female respondents found themselves more business-minded when compared with male students’ responses. As expected, the students evaluated their competence in offering information on IT-infrastructure services more positively if they had studied IT-related topics or had job experience in the IT-industry. The majority of students who answered the survey were under 30 years old (38).

When the answers of the student sample were compared against their status (ranging from student not studying IT-related topics to student working within the IT-industry), the analysis showed slight trend that the students who reported having more experience on IT-related topics also answered the open question by using more words other than “cost” and “savings”. Students who indicated themselves as full-time employees working in the IT-industry were considered as students given that they were taking courses in the Aalto University School of Economics when they answered the survey. Given the limited number of student replies and the breadth of the open-ended question, analysing the connection between the respondents’ mindset (business minded vs. technology minded, see question 6) and answers to the open-ended question was not considered practical. Please see the Appendices for additional information on the student sample.

6 Research results

The research method and respondents introduced in Chapter 5 were used to conduct the empirical experiment. In Chapter 6.1 the goal framing effect is analysed by combining the responses of the IT-professionals and students (H1). Chapter 6.2 continues by analysing the IT-professionals and students separately with the objective of finding out whether differences in responses exist between the two groups in the case of the gain-framed (A) and loss-framed (B) priming texts. Chapter 6.3 analyses the differences between genders within both the IT-professionals and students as a combined group and then separately within the two groups respectively. When analysing the survey responses the limitations of the sample sizes and research methods must be critically evaluated. After reporting the survey results, Chapter 6 continues by focusing on the validity of the research and on the limitations of the research method.

As discussed, the data is analysed by looking for statistically significant differences between the mean ranks of the questionnaire responses presented in the gain-framed text (A) and loss-framed text (B). The responses to the open-ended question concerning the outcomes for companies when implementing *IT-infrastructure services* are analysed for key words and phrases to provide additional insight into the hypotheses.

6.1 Existence of goal framing effect among IT-professionals and students

H1: As a combined group, the respondents answer differently to questions regarding the benefits of *IT-infrastructure services* depending on whether gain- or loss-framed material is presented.

The existence of the goal framing effect among the IT-professionals and students as a combined group was first assessed to see whether the goal framing effect exists in the sample group. The results indicate that:

- 1) Within the IT-professionals and students as a combined group, no statistically

significant differences exist between the answers to the gain-framed questionnaire (A) and loss-framed questionnaire (B).

- 2) Within the IT-professionals and students as a combined group, there are no significant differences in the answers to the open-ended question between the gain-framed and loss-framed questionnaires.

Kruskal-Wallis test on the closed-ended questions revealed no significant differences between the answers to the questionnaire versions A and B. Please see Appendix 10 for the results of the statistical analysis. Table 6-1 shows the analysis of the open-ended question. As can be seen, the word cost was clearly the most used word when describing the impact of implementing *IT-infrastructure services* in companies. Contrary to initial expectations, the research results revealed that the questionnaire version had no significant visible effect on the responses given to the open-ended question. Naturally some differences exist, but given the nature of the data and the size of the sample groups, it is difficult to identify whether these differences are caused by the goal framing effect.

Table 6-1: Combined answers to question 1

Data	Questionnaire		
	Gain-framed version (A)	Loss-framed version (B)	Grand Total
Sum of time savings	1	1	2
Sum of cost savings	2	2	4
Sum of cost	21	16	37
Sum of revenue	4	1	5
Sum of profit	0	5	5
Sum of saving	5	4	9
Sum of effectivity	1	1	2
Sum of efficiency	3	11	14
Sum of effectively	0	1	1
Sum of flexibility	7	3	10
Sum of flexible	1	0	1
Sum of communication	1	0	1
Sum of virtualization	2	2	4
Sum of consolidation	3	3	6
Sum of mobile	6	1	7
Sum of continuity	1	1	2

Based on the analysis of the open-ended and closed-ended questions, H1 rejected. The empirical experiment does not show any significant differences between the responses to questionnaire versions A and B. Since no significant differences exist, based on the results of the empirical experiment it can be stated that when the IT-professionals and students were analysed as a combined group, the results do not indicate the existence of the goal framing effect. However, the analysis does not tell whether potential goal framing effect is subdued by

some other variable or whether the goal framing effect does not exist at all.

6.2 Differences in goal framing effect between IT-professionals and students

H2: The responses given by students vary more between the gain-framed and loss-framed questionnaire versions than the responses given by the case company IT-professionals.

To answer H2, the IT-professionals and students were analysed separately. The analyses were made similarly as for H1. When analysing the responses of the IT-professionals it is noteworthy that fewer IT-professionals than students answered the survey.

The responses received from the students of Aalto University School of Economics show that:

- 1) In the answers given by the students no statistically significant differences exist between the answers to the gain-framed questionnaire (A) and loss-framed questionnaire (B), except for question Q4.1: *“Server consolidation & virtualization usually bring significant competitive advantage for companies”*.
- 2) In the answers given by the students, no significant differences in the answers to the open-ended question exist between the gain-framed and loss-framed questionnaires.

The responses received from the case company IT-professionals show that:

- 3) In the answers given by the IT-professionals no significant differences exist between the answers to the gain-framed questionnaire (A) and loss-framed questionnaire (B).
- 4) In the answers given by the IT-professionals, no significant differences exist in the answers to the open-ended question between the gain-framed and loss-framed questionnaires.

Figures 6-1 and 6-2 below show that concerning question Q2.1: *“The statements in the text convinced me on the benefits of IT-infrastructure services”* the students who received the

loss-framed text expressed their view the question more systematically either as “*neither agree or disagree*” or “*slightly agree*”. The responses of the students who received the gain-framed text on IT-infrastructure services varied more in the Likert scale. Comparison with the IT-professionals’ responses to question 2.1 shows the opposite: the answers of the IT-professionals who received the gain-framed questionnaire (A) varied less in the Likert-scale than the answers of the IT-professionals who received the loss-framed questionnaire (B). For the student group, the analysis of responses to question 2.1 in questionnaire A shows median of 5 and mode of 5. As a comparison, for IT-professionals the mean and median are the same. For questionnaire B, the mode and median for the students are exactly the same as for the gain-framed questionnaire (A). For IT-professionals the results show median of 5.5 and mode of 6.

Figure 6-1: Box plot on students' answers to question 2.1

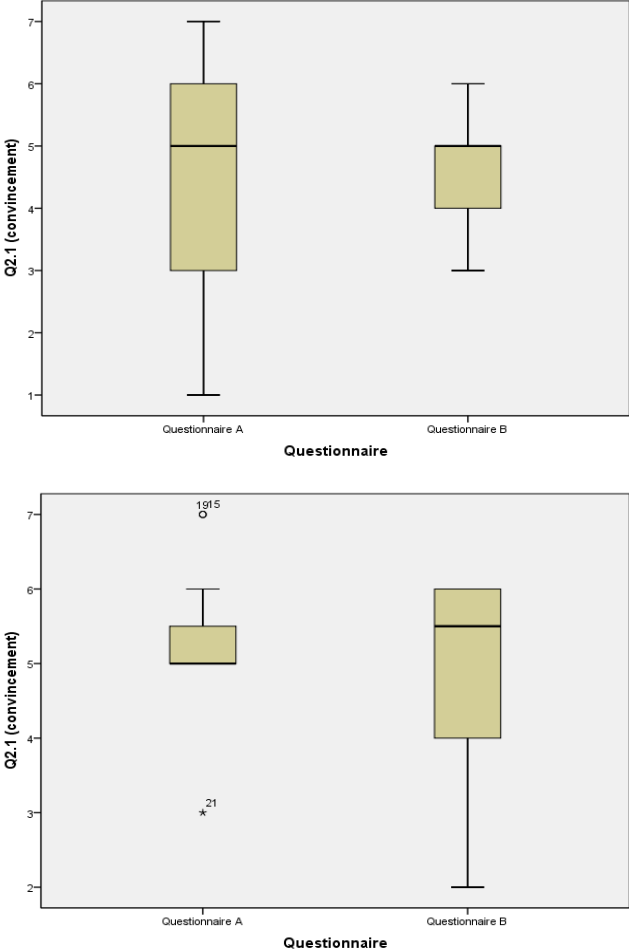


Figure 6-2: Box plot on IT-professionals' answers to question 2.1

For question 2.1, the differences in the mean ranks provided by the Kruskal-Wallis test were not statistically significant in the 95% confidence level. Concerning the IT-professionals, the

Kruskal-Wallis analysis of variance test showed no significant differences with the questionnaire version being as the independent variable for any of the closed-ended questions. Concerning the student group, analysis of the other closed-ended questions showed no statistically significant differences between students' answers to the different versions of the questionnaire exist, except for question 4.1. Please see Appendices 11 and 12 for complete Kruskal-Wallis test results concerning H2.

As stated, within the student sample question 4.1 was the only question where statistically significant difference was found between the responses to the A and B –versions of the questionnaire. Table 6-2 shows that the difference between versions A and B was significant on the 95% confidence level. Students answering questionnaire B showed more agreement to question 4.1 than students who were given questionnaire A. As a comparison, the differences of the students' answers to questions 4.2 and 4.3 concerning solutions for mobile employees and business continuity were far from being statistically significant with asymptotic significances of 0,895 and 0,693.

Table 6-2: Kruskal-Wallis test results for students: question 4.1

Test Statistics ^{a,b}			
	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)
Chi-Square	4,375	,017	,156
df	1	1	1
Asymp. Sig.	,036	,895	,693

a. Kruskal Wallis Testb. Grouping Variable: Questionnaire

When the responses to the open-ended questionnaire were analyzed the answers given by the students to the open-ended question did not vary between the gain-framed and loss-framed versions in terms of positive or negative tone. In general, the answers given by both the IT-professionals and students were characterised by general types of benefits, such as cost savings and time savings of *IT-infrastructure services*. No significant differences were found in the tone of the answers between the A- and B questionnaire versions. In both cases, the students stressed cost-savings and efficiency-gains as the benefits of *IT-infrastructure services*. None of the answers were characterised by negative wordings (i.e. threats, etc). Given the fact that the answers of the open-ended questions are hard to quantify, differences in the answers between the IT-professionals and students cannot be analysed unequivocally.

In terms of word counts, only slight differences exist between the answers given to the A and B –versions. Tables 6-3 and 6-4 show the differences in the word counts used by IT-professionals and students when answering the open-ended question. When interpreting the responses to the open-ended questions it is important to remember that the sample size was limited to 50 students. In addition, the nature of the open-ended question format poses restrictions in using statistical analysis techniques.

Table 6-3: IT-professionals' answers to question 1

Data	Questionnaire		Grand Total
	Gain-framed version (A)	Loss-framed version (B)	
Sum of time savings	0	0	0
Sum of cost savings	1	0	1
Sum of cost	9	7	16
Sum of revenue	2	0	2
Sum of profit	0	2	2
Sum of saving	3	1	4
Sum of effectivity	1	0	1
Sum of efficiency	1	5	6
Sum of effectively	0	0	0
Sum of flexibility	2	1	3
Sum of flexible	0	0	0
Sum of communication	0	0	0
Sum of virtualization	0	1	1
Sum of consolidation	1	2	3
Sum of mobile	1	0	1
Sum of continuity	1	1	2

Table 6-4: Students' answers to question 1

Data	Questionnaire		Grand Total
	Gain-framed version (A)	Loss-framed version (B)	
Sum of time savings	1	1	2
Sum of cost savings	1	2	3
Sum of cost	12	9	21
Sum of revenue	2	1	3
Sum of profit	0	3	3
Sum of saving	2	3	5
Sum of effectivity	0	1	1
Sum of efficiency	2	6	8
Sum of effectively	0	1	1
Sum of flexibility	5	2	7
Sum of flexible	1	0	1
Sum of communication	1	0	1
Sum of virtualization	2	1	3
Sum of consolidation	2	1	3
Sum of mobile	5	1	6
Sum of continuity	0	0	0

Below are some examples of the answers given by the students and IT-professionals for A- and B –questionnaire versions.

Questionnaire version A:

Student: *“Mobile workforce, keeping up with the competition, creating a competitive advantage.”*

Student: *“You save time for real work; it is easier to find information. This makes operations faster, lower costs.”*

Student: *“Significantly reduce the number of servers, lower total cost, better working environment but also mobile working easier, savings in IT staff hours.”*

IT-professional: *“cost saving, more reliable environment, flexibility”*

IT-professional: *“Focusing on mobile workforce, revenue increase by increasing employee productivity is significant. Even if counting only 1-2% increase in value, increase in productivity, increase in revenue, reduce customer/employee needs -> lower costs”*

IT-professional: *“cost efficiency, flexibility to adapt sudden changes in requirements, predictability”*

Questionnaire version B:

Student: *“Server consolidation, growth in scales, enhanced long-term profits”*

Student: *“Increased revenue and efficiency”*

Student: *“Saving costs, strategic flexibility, both operational and e.g. Vendor selection, more opportunities to innovate or to introduce newer technologies, less chance of a strong lock in*

IT-professional: *“Risk management, cost reduction, operational efficiency” --> Advantage of low cost workforce*

IT-professional: *Realtime information sharing, efficiency, possibility to work remotely, consolidated data storing, business continuity, savings in maintenance cost and similar, automation.*

IT-professional: *They are having advantages over the companies not adapting the IT-infrastructure technologies in cost efficiency, business results and in integration perspective.*

Based on the results of the empirical experiment H2 is rejected. Although the results showed a statistically significant difference for the student sample concerning question 4.1, the Kruskal-

Wallis test results of the other similar closed-ended questions reveal no statistically significant differences between the students' responses to questionnaire versions A and B. Ergo, the survey results do not indicate consistent significant differences in the results between the IT-professionals and students with questionnaire version being the independent variable.

6.3 Differences in goal framing effect between genders

H3: The responses given by women vary more between the gain-framed and loss-framed questionnaire versions than the responses given by men.

To analyse the effect of gender on the survey results, the results given by the IT-professionals and students were analysed as a combined group by using Kruskal-Wallis test with gender being the independent variable. The results of the empirical experiment show that:

As a combined group:

- 1) The differences in the responses given by all the female respondents as a combined group to questionnaire versions A and B were not significant.
- 2) The differences in the responses given by all the male respondents as a combined group to questionnaire versions A and B were not significant.

Among the IT-professionals:

- 3) When the answers given by the male IT-professionals were analysed separately with questionnaire version being the independent variable, no significant differences were found.
- 4) When the answers given by the female IT-professionals were analysed separately with questionnaire version being the independent variable, no significant differences were found.

Among the students:

- 5) When the answers given by the male students were analysed separately with questionnaire version being the independent variable, no significant differences were found.
- 6) When the answers given by the female students were analysed separately with

questionnaire version being the independent variable, no significant differences were found.

Further analysis on the effect of gender to the questionnaire responses within the gain-framed and loss-framed questionnaire versions, showed that:

- 7) No significant differences were found, when the differences in the responses given to questionnaire version A were analysed with gender being the independent variable.
- 8) Significant differences were found concerning question 3.2, when the differences in the responses given to questionnaire version B were analysed with gender being the independent variable. Men showed more agreement towards the question.

As discussed in Chapter 6.2, concerning conclusions of H1, within the student sample the responses to question 4.1 indicated a statistically significant difference between questionnaire versions A and B. When the students' results concerning question 4.1 were further examined, the Kruskal-Wallis test revealed that statistical difference was only found among the answers given by male students on the 99% confidence level ($p < 0,01$). As a comparison, no statistical difference was found within women's' answers to question 4.1. In conclusion, within the student sample there is a statistically significant difference between genders, but only concerning one closed-ended question. When interpreting these results it is again critical to acknowledge the limitation posed by the sample size and the sample selection procedure. Table 6-5 shows the Kruskal-Wallis test results given by the male students to question 4.1.

Table 6-5: Kruskal-Wallis test results for male students: question 4.1

	Q4.1 (consolidation & virtualization)	Q4.1 (consolidation & virtualization)
Chi-Square	7,346	2,407
df	1	1
Asymp. Sig.	,007	,121

Concerning H3 conclusions 7 and 8, Table 6-6 shows the Kruskal-Wallis test results for question 3.2. The results show significance beyond the 95% -level. However, when interpreting this result, the results of question 4.2 have been attached as a comparison. As can be seen the two similar questions yielded completely different results: according to Table 6-5, there is 96,9% probability that the differences in the responses to question 4.2 were caused by chance alone. These differences show the ambiguity in the research results.

Table 6-6: Kruskal-Wallis test results for questionnaire version B, gender

Test Statistics ^{a,b}		
	Q3.2 (no gains for mobile workers)	Q4.2 (solutions for mobile employees)
Chi-square	4,227	,001
df	1	1
Asymp. Sig.	,040	,969

a. Kruskal Wallis Test

Analysis of the open-ended question did not reveal any notable differences between the answers given by male and female respondents. H3 is rejected based on the results of the empirical experiment. Although some differences between genders were found these differences are not enough evidence to accept H3.

6.4 Research validity & limitations

Given the fact that the sample sizes for both students and IT-professionals are small the estimates provides by the two samples are subject to sampling error. Another crucial aspect lies in the selection procedure of the respondents. Namely, the student participants of three courses were chosen. The IT-professionals were selected within the employees working in the case company headquarters in the Helsinki metropolitan area. The selection procedure is to some extend non-probabilistic. In addition, the sample of IT-professionals suffered from significant lack of responses, which lead to a low response rate of approximately 17% (the questionnaire was received by 120 IT-professionals of whom 22 replied). For the sake of reference, using the approximation $1/\sqrt{N}$, the margin of error for the sample of IT-professionals (N=20) would be 22,4%, for the student sample (N=50) 14,1% and for all the respondents combined (N=70) 20%. The sample sizes of empirical research settings for *psychological framing* research are normally done between 100 and 300 respondents (Banks & al. 1995; Kuhberger, 1998; Levin & al. 1998)

Given these limitations, the reported results for the research results are subject to error. It is relevant to understand the limitations these sample characteristics create when the statistical significance of the research results is evaluated. Despite these limitations it is noteworthy to remember that the purpose of the empirical experiment was not to measure the respondents' opinions on *IT-infrastructure services*, but to focus on the differences between the responses given to the gain-framed and loss-framed questionnaire versions. Given this purpose and the fact that the experiment is designed to indicate a known, universal psychological phenomenon, the errors created by the possible sample bias can be considered to be less significant. As was stated in Chapter 1, the research on psychological goal framing is characterised by student samples. In several articles the conclusions of the research made on students are generalized (Kuhberger, 1998).

Concerning the variables that have researched to affect the intensity of the *framing effect*, it is plausible that the differences that might be caused by the goal framing effect are in fact lessened by some other variable present in the sample groups. For example, the non-existence of the goal framing effect might be explained by other individual differences besides gender and intrinsic self-relevance of the topic.

The way the questionnaire was designed might also affect the research results. For example, the answers given to the open-ended question in the beginning might have in fact made the affected the respondents in a way that they answered the closed-ended questions based on their answers to the open-ended questions. If in fact, writing the answers down instead of ticking a choice alternative might have made the respondents think more their choices.

To conclude, as most research in social sciences, also the research on psychological goal framing is characterised by several variables, making it challenging to isolate cause and effect relationships. In other words, one might almost speak of a chaotic system in a sense that including or excluding a variable can result in different research results. Second, finding out the interaction of these variables and thirdly, to identify the subtle, hidden variables can cause significant variations in the research results (are the differences really caused by goal framing, or e.g. gender or some unknown factor). The indications of the empirical experiment are discussed in the next chapter.

6.5 Discussion

The results of the empirical experiment show that framing the benefits of *IT-infrastructure services* in terms of gains or losses did not affect the responses given by IT-professionals and students. As described in Chapter 1, the new approach of the empirical experiment confirms earlier research on psychological goal framing by showing that the existence of the goal framing effect is subject to discussion. Of the three modes of framing, goal framing has received the least attention when measured in the number of academic articles (Kuhberger, 1998; Levin, 1998). The empirical experiment of the thesis contributes to the understanding of the variables that affect the existence of the goal framing effect.

In the theoretical part, the thesis analyzed earlier academic literature on the effects of gender, level of involvement, individual differences, information amount and hypothetical vs. real situation on the goal framing effect. The empirical experiment on the IT-professionals and students show that the level of involvement (H2) seems to have no effect in a situation, where the respondents are subjected to a hypothetical framing situation. In other words, the respondents were not in the position of actually buying *IT-infrastructure services*. This hypothetical situation differs from example from the research done by Rothman & al. (1999) where the researchers measured the strength of the goal framing effect by counting how many respondents actually used their free coupon to redeem sunscreen when exposed to gain-framed and loss-framed promotion messages. The researchers found that gain-framed messages were more efficient to trigger behaviour. The research setting used by Ganzach & Karsahi (1995), resembled to some extent the research setting used by the empirical experiment of this thesis. However, differences between the approaches still exist. For example, although the setting used by Ganzach & Karsahi was hypothetical, the decision to acquire a credit card is still something that many people feel on a personal level.

The situation of acquiring *IT-infrastructure services* has little personal appeal to respondents who are not actually involved in discussions of purchasing the services through their work. Although the empirical experiment assumed that the IT-professionals would have higher level of involvement in purchasing *IT-infrastructure services* than students, it can be argued that perhaps even a more highly involved group would have been for example the CIO:s who can be highly involved in *IT-infrastructure services* through their daily work. In this context it is noteworthy to distinguish the effects of knowledge on the task domain and intrinsic self -

relevance on the task domain on the goal framing effect. The lack of sufficient personal involvement might be one factor that explains the results empirical experiment, namely that no goal framing effect was found. The fact that in general, students evaluated their confidence in offering information on *IT-infrastructure services* as slightly lower than the IT-professionals indicates (as expected) that students have less knowledge on the task domain.

Although the thesis assumed that the effect individual differences in personality is negligible when it comes to the framing effect, the literature review on the variables of goal framing effect in Chapter 4 revealed that individual personality differences can cause variance in the research results. For example, Levin & al. (2002) found that individuals with different thinking styles respond differently to framing efforts. Concerning the empirical experiment between the IT-professionals and students, the variation caused by individual differences might naturally affect the research results.

One of the objectives of the empirical experiment was to provide additional contribution to the existing knowledge on the effect of gender on the goal framing effect. The results of the empirical experiment show no consistent and significant findings that would indicate that the differences in answers given by men and women on the gain-framed and loss-framed questionnaire would be significant. However, when it comes to how the respondents answered to individual questions, the results showed some indication that might imply that men and women would respond differently to the loss-framed message. As discussed in Chapter 4, Huang & Wang (2009) argued that the task domain might explain the differences in responses given by men and women to gain-framed and loss-framed messages. Given that IT-infrastructure services represents a completely new task domain, additional research is needed to find out the effect of this new task domain to goal framing.

What is comes to information amount; the one-page text was used to frame the respondents. Since both groups were framed with exactly the same information, no analysis can be made on the effect of information amount on the responses. One aspect might be that the IT-professionals paid less attention to the framing text given that they already had more information on the *IT-infrastructure services* as opposed to students of whom some might have heard of the IT benefits of the services first time in the questionnaire. Although this might be a plausible argument, analysis of the open-ended question did not reveal that IT-professionals or students would have used similar expressions or words that were described in

the framing text.

Another interesting indication and possibly a new element of further research is the fact that the gain-framed and loss-framed questionnaires seemed to have no indication on the emotions of the respondents. When the interdependencies of the answers to closed-ended questions were analyzed by using Spearman's rank correlation coefficient, the results indicated statistically significant relationships on the 99%-level (2-tailed test) between question 2 (convincement) and all the positive emotions included in the questionnaire (optimistic, satisfied and enthusiastic). When a rank correlation matrix was constructed on all the questions, the results surprisingly show that the responses to the positive emotions were highly correlated with the questions concerning the benefits of *IT-infrastructure services*. The responses concerning negative emotions (helpless, worried and frustrated) were not nearly as much correlated with the other questions. An idea for further research would be to provide additional understanding to *psychological framing* by experimenting whether the correlations differ significantly when respondents are subjected to either gain-framed or loss-framed questions.

The research results of the empirical experiment and the earlier academic discussion on the effect of different variables on the goal framing effect show that the existence of goal framing effect is not self-evident. Although in their meta analyses Levin (1998) and Kuhberger (1998) have tried to provide categorizations to explain the variation in the goal framing effect, the researchers did not succeed to fully explain the variation of research results in academic articles on goal framing. The literature review and the empirical experiment of this thesis contribute to the understanding that the goal framing effect is in fact affected by variables beyond the gain-framed and loss-framed messages. Given the research setting and limitations of the empirical experiment it is impossible to say based on the results of the empirical experiment, whether goal framing effect can actually exist on the given hypothetical task domain. The results might indicate different results if for example some aspects of the questionnaire would be changed, e.g. the open-ended question might have affected the respondents' answers to the closed-ended questions.

Despite the limitations of the research it can be concluded that the empirical experiment provided some indication that the existence of the goal framing effect might be implausible in a hypothetical situation on a task domain towards which the respondents do not most likely

feel much personal appeal. The results of the empirical experiment indicate that more research is needed on the variables of the goal framing effect. The thesis introduced a new research setting to study the goal framing effect. No previous academic research exists on the framing effect in a task domain that is traditionally seen to be characterised by elaborate analyses and several decision making criteria. So far, the academic research on goal framing has focused on experimenting on simple decisions in domains that are generally known for the general public, such as consumers and students. More research is needed on the effects of framing on elaborate decision making problems.

7 Conclusions

The contribution of the thesis is twofold. First, the thesis provided a thorough literature review on the three modes of framing and provides the reader a current review on the variables that have been researched based on their influence on the goal framing effect size. Second, the empirical part of the thesis is exploratory in nature and provided a completely new type of between subjects research design using two target groups in a domain where the effect of psychological framing has not been researched before.

The thesis began by introducing the connections of psychological framing to economic sciences and provided introduction to the three modes of framing by Levin & al. (1998). After this, the thesis provided literature review on the variables that have shown to affect the goal framing effect. The analysis on academic articles on *psychological framing* is characterised by lack of unified research results on the effects of variables such as gender, level of involvement, hypothetical vs. real choice situation and amount of information on the goal framing effect.

The thesis then used the literature review as the basis for the empirical, between-groups experiment with the purpose to find out whether goal framing effect exist in a hypothetical task domain within experts and non-experts, namely IT-professionals and students. The IT-professionals and students were primed by using a gain-framed or loss-framed text on the benefits of *IT-infrastructure services*. The respondents' answers were analyzed by searching for significant differences between the answers given to the gain-framed and loss-framed questionnaires.

The empirical experiment did not find sufficient indication on the existence of the goal framing effect. Therefore, the hypotheses of the thesis are rejected. Although the empirical research is subject to limitations, the results provide indicative information that the existence of the goal framing effect might be dependent on the variables discussed. Although the initial hypotheses of the empirical research were rejected, the thesis succeeded in showing results that contrast the current academic research in goal framing by using a new type of research setting. These results show the limitations of the current research in psychological goal

framing. More research is needed on goal framing in task domain where choice situations are elaborate and are traditionally not considered to be affected by psychological decision biases.

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9 Appendix

Appendix 9-1: Gain-framed text on case company' IT-infrastructure services

IT-infrastructure landscape is changing

Today's IT-infrastructure isn't built for what's coming. The new competitive environment requires companies to manage information more effectively and further optimize the use of resources while dealing with increasing amounts of data. If you adopt the IT-infrastructure technologies listed below, **you can** gain advantages in the following areas:

1) Server consolidation & virtualization

* **By using** technologies in server consolidation and virtualization **you can** significantly reduce the number of servers in your infrastructure. **You will** realize significantly lower total cost of ownership.

2) Mobile workforce

* **You will** be able to provide working environment that enables the company's mobile workforce to meet productivity and performance demands of the business.

3) Business continuity

* **You will** be using proprietary analytical tools to monitor your IT environment. **You will find** a designated team of technical support specialists working as a remote extension of your IT staff.

* **With** this proactive approach to support **you can** position your organization for growth with a stable infrastructure. **You will avoid** costly outages (avg. \$45,000/ hour) and **have the** opportunity to save up to 2500 IT staff hours.

In short, **if you utilize** these technologies, you **can** relax because you **will have** an IT-infrastructure that will accelerate your business. Your company **is** ready to face the opportunities and challenges of the new market place. The message is clear—If you **utilize** the technologies, in the long run you **can** benefit and **will gain** the first place.

Appendix 9-2: Loss-framed text on case company's IT-infrastructure services

IT-infrastructure landscape is changing

Today's IT-infrastructure isn't built for what's coming. The new competitive environment requires companies to manage information more effectively and further optimize the use of resources while dealing with increasing amounts of data. If you do not adopt the IT-infrastructure technologies listed below, you **can not** gain advantages in the following areas:

1) Server consolidation & virtualization

* By **not using** technologies in server consolidation and virtualization you **can not** significantly reduce the number of servers in your infrastructure. You **will not** realize significantly lower total cost of ownership.

2) Mobile workforce

* You **will not** be able to provide working environment that enables the company's mobile workforce to meet productivity and performance demands of the business.

3) Business continuity

* You **will not** be using proprietary analytical tools to monitor your IT environment. You **won't find** a designated team of technical support specialists working as a remote extension of your IT staff.

* **Without** this proactive approach to support you **can not** position your organization for growth with a stable infrastructure. You **will not** avoid costly outages (avg. \$45,000/ hour) and **do not have** the opportunity to save up to 2500 IT staff hours.

In short, if you **do not** utilize these technologies, you **can not** relax because you **will not** have an IT-infrastructure that will accelerate your business. Your company **is not** ready to face the opportunities and challenges of the new market place. The message is clear—If you **do not** utilize the technologies, in the long run you **can not** benefit and **will not** gain the first place.

Appendix 9-3: Questionnaire

Question 1:

In your own personal opinion, what are the three (3) most significant outcomes for companies that implement IT-infrastructure technologies, for example in terms of revenue or operational performance?

You can base your answer on your previous knowledge, on the text, or both.

Please shortly write down your answer in the text box below.

In questions 2-4, the following Likert-levels were used: strongly disagree, disagree, somewhat disagree, neither agree or disagree, somewhat agree, agree, strongly agree.

Question 2:

In this part of the questionnaire (questions 2-4), we would like to know about your own, personal opinions on the statements presented in the text “IT-infrastructure landscape is changing. We do not assume that you will be consistent with your answers. Please tick one answer for each statement.

To what extent do you agree or disagree with the following statement?

2.1 The statements in the text convinced me on the benefits of *IT-infrastructure services*.

Question 3:

To what extent do you agree or disagree with the following statements?

3.1 IT-infrastructure technologies are a significant source of operational efficiency for companies.

3.2 IT-infrastructure technologies don't really provide significant gains for workers who are often on the road.

3.3 IT-infrastructure technologies are an important aspect of risk management for companies.

3.4 I believe that by acquiring IT-infrastructure technologies, companies can achieve all the benefits described in the text.

3.5 I would acquire these technologies even if by doing so I would have to take significant risks.

Question 4:

To what extent do you agree or disagree with the following statements?

4.1 Server consolidation & virtualization usually bring significant competitive advantage for companies.

4.2 Solutions for mobile employees usually bring significant competitive advantage for companies.

4.3 Solutions for business continuity usually bring significant competitive advantage for companies.

In question 5, the following Likert-levels were used: very untrue of me, untrue of me, somewhat untrue of me, neutral, somewhat true of me, true of me, very true of me.

Question 5:

Please indicate how the text “IT-infrastructure landscape is changing” made you feel. Please answer these questions as honestly as possible. We are not assuming that you will be consistent with your answers. Please tick one answer for each statement.

The statements about the IT-services in the text made me feel:

5.1 Optimistic

5.2 Satisfied

5.3 Helpless

5.4 Worried

5.5 Frustrated

For question 6, the same Likert-levels were used as for questions 2-4.

Question 6:

In this final part, we would like you to provide some information about yourself.

Please respond to the following statements by your own personal opinion. Please tick one answer for each statement.

To what extent do you agree or disagree with the following statements?

6.1: I am competent in offering information on *IT-infrastructure services*.

6.2: I am more business minded than technology minded person.

Question 7:

Please indicate your gender.

7.1 Male

7.2 Female

Question 8:

8.1 Please indicate your year of birth in the form 19XX (e.g. 1975)

Question 9:

Please indicate whether you are:

9.1 Full-time employee working in the IT-industry

9.2 Student working in the IT-industry

9.3 Student studying IT-related topics, but not working in the IT-industry

9.4 Student not studying and not working on the IT-industry

Appendix 9-4: Questionnaire coding

Questionnaire version	
A	1
B	2

Gender	
Male	1
Female	2

Age	
20-30	1
30-40	2
40-50	3
50-60	4

Questions 2,3,4 & 6.2	
Strongly disagree	1
Disagree	2
Somewhat disagree	3
Neither agree or disagree	4
Somewhat agree	5
Agree	6
Strongly agree	7

Question 9	
Student not studying and not working in the IT-industry	1
Student studying IT-related topics but not working in the IT-industry	2
Student working in the IT-industry	3
Full-time employee working in the IT-industry	4

Appendix 9-5: Students' sample characteristics, status & level of confidence

Status		I am competent in offering advice on IT-infrastructure services						Total	
		Very untrue of me	Untrue of me	Somewhat untrue of me	Neutral	Somewhat true of me	True of me		Very true of me
Student not studying and not working in the IT-industry	Count	2	5	3	0	0	0	0	10
	% within Status	20,0%	50,0%	30,0%	,0%	,0%	,0%	,0%	100,0%
	% within Competence	66,7%	83,3%	30,0%	,0%	,0%	,0%	,0%	20,0%
Student studying IT-related topics but not working in the IT-industry	Count	1	1	3	5	7	0	0	17
	% within Status	5,9%	5,9%	17,6%	29,4%	41,2%	,0%	,0%	100,0%
	% within Competence	33,3%	16,7%	30,0%	62,5%	70,0%	,0%	,0%	34,0%
Student working in the IT-industry	Count	0	0	2	1	3	4	3	13
	% within Status	,0%	,0%	15,4%	7,7%	23,1%	30,8%	23,1%	100,0%
	% within Competence	,0%	,0%	20,0%	12,5%	30,0%	66,7%	60,0%	26,0%
Full time employee working in the IT-industry	Count	0	0	1	1	0	2	2	6
	% within Status	,0%	,0%	16,7%	16,7%	,0%	33,3%	33,3%	100,0%
	% within Competence	,0%	,0%	10,0%	12,5%	,0%	33,3%	40,0%	12,0%

Appendix 9-6: Students' sample characteristics, gender & level of confidence

Gender		I am competent in offering advice on IT-infrastructure services.						Total
		Very untrue of me	Untrue of me	Somewhat untrue of me	Neutral	Somewhat true of me	True of me	
Male	Count	2	4	6	4	8	6	5
	% within Sex	5,7%	11,4%	17,1%	11,4%	22,9%	17,1%	14,3%
	% within Competence	66,7%	66,7%	60,0%	50,0%	80,0%	100,0%	100,0%
	% of Total	4,0%	8,0%	12,0%	8,0%	16,0%	12,0%	10,0%
Female	Count	1	2	4	4	2	0	0
	% within Sex	7,7%	15,4%	30,8%	30,8%	15,4%	,0%	,0%
	% within Competence	33,3%	33,3%	40,0%	50,0%	20,0%	,0%	,0%
	% of Total	2,0%	4,0%	8,0%	8,0%	4,0%	,0%	,0%

Appendix 9-7: Students' sample characteristics, age distribution

Age	Frequency	Percent
20-30	38	76,0
30-40	8	16,0
40-50	1	2,0
50-60	3	6,0
Total	50	100,0

Appendix 9-8: IT-professionals' sample characteristics, level of confidence

Status	I am competent in offering advice on IT-infrastructure services.						Total
	Very untrue of me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me	
Full time employee working in the IT-industry	2	2	2	3	9	4	22

Appendix 9-9: IT-professionals' sample characteristics, Age distribution

Age	Frequency	Percent
20-30	4	9,1
30-40	8	18,2
40-50	3	6,8
50-60	7	15,9
Total	22	50,0

Appendix 9-10: H1, Kruskal-Wallis test results, combined, questionnaire version

Ranks

Questionnaire		N	Mean Rank
Q2.1 (convincement)	Questionnaire A	37	37,66
	Questionnaire B	35	35,27
	Total	72	
Q3.1 (operational efficiency)	Questionnaire A	37	37,73
	Questionnaire B	35	35,20
	Total	72	
Q3.2 (no gains for mobile workers)	Questionnaire A	37	36,92
	Questionnaire B	35	36,06
	Total	72	
INVERTED Q3.2 (no gains for mobile workers)	Questionnaire A	37	36,08
	Questionnaire B	35	36,94
	Total	72	
Q3.3 (important in risk management)	Questionnaire A	37	39,51
	Questionnaire B	35	33,31
	Total	72	
Q3.4 (achievement of benefits)	Questionnaire A	37	31,78
	Questionnaire B	34	40,59
	Total	71	
Q3.5 (willingness to take risks)	Questionnaire A	37	33,30
	Questionnaire B	35	39,89
	Total	72	

Test Statistics^{a, b}

	Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingness to take risks)	Q4.1 (consolidation & virtualization)
Chi-square	,263	,308	,035	,035	1,760	3,445	1,881	1,845
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,608	,579	,852	,852	,185	,063	,170	,174

b. Grouping Variable: Questionnaire

Ranks			
	Questionnaire	N	Mean Rank
Q4.1 (consolidation & virtualization)	Questionnaire A	37	33,35
	Questionnaire B	35	39,83
	Total	72	
Q4.2 (solutions for mobile employees)	Questionnaire A	37	36,82
	Questionnaire B	35	36,16
	Total	72	
Q4.3 (Solutions for business continuity)	Questionnaire A	37	34,66
	Questionnaire B	34	37,46
	Total	71	

Test Statistics^{a,b}

	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)	Summed
Chi-square	1,845	,020	,353	,671
df	1	1	1	1
Asymp. Sig.	,174	,887	,553	,413

b. Grouping Variable: Questionnaire

Ranks			
	Questionnaire	N	Mean Rank
Q5.1 (optimistic)	Questionnaire A	37	34,72
	Questionnaire B	35	38,39
	Total	72	
Q5.2 (satisfied)	Questionnaire A	37	34,69
	Questionnaire B	35	38,41
	Total	72	
Q5.3 (enthusiastic)	Questionnaire A	37	35,22
	Questionnaire B	34	36,85
	Total	71	
Summed	Questionnaire A	34	33,46
	Questionnaire B	34	35,54
	Total	68	
Q5.4 (helpless)	Questionnaire A	37	35,32
	Questionnaire B	34	36,74
	Total	71	
Q5.5 (worried)	Questionnaire A	37	36,76
	Questionnaire B	35	36,23
	Total	72	
Q5.6 (frustrated)	Questionnaire A	37	39,08
	Questionnaire B	35	33,77
	Total	72	
Summed	Questionnaire A	33	33,83
	Questionnaire B	32	32,14
	Total	65	

	Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic)	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
Chi-square	,589	,604	,116	,191	,087	,012	1,222	,132
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,443	,437	,734	,662	,768	,913	,269	,716

b. Grouping Variable: Questionnaire

Appendix 9-11: H2, Kruskal-Wallis test results, students, questionnaire version

Ranks

	Questionnaire	N	Mean Rank
Q2.1 (convincement)	Questionnaire A	25	26,40
	Questionnaire B	25	24,60
	Total	50	
Q3.1 (operational efficiency)	Questionnaire A	25	27,96
	Questionnaire B	25	23,04
	Total	50	
INVERTED Q3.2 (no gains for mobile workers)	Questionnaire A	25	26,34
	Questionnaire B	25	24,66
	Total	50	
Q3.3 (important in risk management)	Questionnaire A	25	27,90
	Questionnaire B	25	23,10
	Total	50	
Q3.4 (achievement of benefits)	Questionnaire A	25	22,42
	Questionnaire B	25	28,58
	Total	50	
Q3.5 (willingness to take risks)	Questionnaire A	25	23,28
	Questionnaire B	25	27,72
	Total	50	

Test Statistics^{a, b}

	Q2.1 (convincement)	Q3.1 (operational efficiency)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingness to take risks)
Chi-Square	,213	1,680	,191	1,526	2,390	1,232
df	1	1	1	1	1	1
Asymp. Sig.	,644	,195	,662	,217	,122	,267

a. Kruskal Wallis Testb. Grouping Variable: Questionnaire

Q4.1 (consolidation & virtualization)	Questionnaire A	25	21,34
	Questionnaire B	25	29,66
	Total	50	
Q4.2 (solutions for mobile employees)	Questionnaire A	25	25,24
	Questionnaire B	25	25,76
	Total	50	
Q4.3 (Solutions for business continuity)	Questionnaire A	25	24,24
	Questionnaire B	24	25,79
	Total	49	
Summed	Questionnaire A	23	22,50
	Questionnaire B	25	26,34
	Total	48	

Test Statistics^{a, b}

	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)
Chi-Square	4,375	,017	,156
df	1	1	1
Asymp. Sig.	,036	,895	,693

a. Kruskal Wallis Test. b. Grouping Variable: Questionnaire

	Questionnaire	N	Mean Rank
Q5.1 (optimistic)	Questionnaire A	25	23,44
	Questionnaire B	25	27,56
	Total	50	
Q5.2 (satisfied)	Questionnaire A	25	23,30
	Questionnaire B	25	27,70
	Total	50	
Q5.3 (enthusiastic)	Questionnaire A	25	25,64
	Questionnaire B	24	24,33
	Total	49	
Summed	Questionnaire A	23	23,41
	Questionnaire B	24	24,56
	Total	47	
Q5.4 (helpless)	Questionnaire A	25	24,58
	Questionnaire B	25	26,42
	Total	50	
Q5.5 (worried)	Questionnaire A	25	27,16
	Questionnaire B	25	23,84
	Total	50	
Q5.6 (frustrated)	Questionnaire A	25	28,14
	Questionnaire B	25	22,86
	Total	50	
Summed	Questionnaire A	22	24,55
	Questionnaire B	23	21,52
	Total	45	

Test Statistics^{a, b}

	Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic)	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
Chi-Square	1,060	1,235	,107	,083	,213	,679	1,741	,608
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,303	,266	,744	,773	,645	,410	,187	,435

a. Kruskal Wallis Testb. Grouping Variable: Questionnaire

Appendix 9-12: H2, Kruskal-Wallis test results, IT-professionals, questionnaire version

Ranks

Questionnaire		N	Mean Rank
Q2.1 (convincement)	Questionnaire A	12	11,54
	Questionnaire B	10	11,45
	Total	22	
Q3.1 (operational efficiency)	Questionnaire A	12	10,63
	Questionnaire B	10	12,55
	Total	22	
Q3.2 (no gains for mobile workers)	Questionnaire A	12	12,46
	Questionnaire B	10	10,35
	Total	22	
INVERTED Q3.2 (no gains for mobile workers)	Questionnaire A	12	10,54
	Questionnaire B	10	12,65
	Total	22	
Q3.3 (important in risk management)	Questionnaire A	12	12,00
	Questionnaire B	10	10,90
	Total	22	
Q3.4 (achievement of benefits)	Questionnaire A	12	9,88
	Questionnaire B	9	12,50
	Total	21	
Q3.5 (willingness to take risks)	Questionnaire A	12	10,46
	Questionnaire B	10	12,75
	Total	22	

Test Statistics^{a, b}

	Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingness to take risks)
Chi-square	,001	,556	,642	,642	,172	,983	,714
df	1	1	1	1	1	1	1
Asymp. Sig.	,972	,456	,423	,423	,678	,321	,398

b. Grouping Variable: Questionnaire

Q4.1 (consolidation & virtualization)	Questionnaire A	12	12,00
	Questionnaire B	10	10,90
	Total	22	
Q4.2 (solutions for mobile employees)	Questionnaire A	12	11,63
	Questionnaire B	10	11,35
	Total	22	
Q4.3 (Solutions for business continuity)	Questionnaire A	12	10,92
	Questionnaire B	10	12,20
	Total	22	
Summed	Questionnaire A	12	11,04
	Questionnaire B	10	12,05
	Total	22	

Test Statistics^{a,b}

	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)
Chi-square	,167	,013	,234
df	1	1	1
Asymp. Sig.	,683	,908	,628

a. Kruskal Wallis Test

Ranks

Questionnaire		N	Mean Rank
Q5.1 (optimistic)	Questionnaire A	12	11,79
	Questionnaire B	10	11,15
	Total	22	
Q5.2 (satisfied)	Questionnaire A	12	11,92
	Questionnaire B	10	11,00
	Total	22	
Q5.3 (enthusiastic)	Questionnaire A	12	10,38
	Questionnaire B	10	12,85
	Total	22	
Summed	Questionnaire A	11	10,91
	Questionnaire B	10	11,10
	Total	21	
Q5.4 (helpless)	Questionnaire A	12	11,29
	Questionnaire B	9	10,61
	Total	21	
Q5.5 (worried)	Questionnaire A	12	9,92
	Questionnaire B	10	13,40
	Total	22	
Q5.6 (frustrated)	Questionnaire A	12	11,25
	Questionnaire B	10	11,80
	Total	22	
Summed	Questionnaire A	11	9,64
	Questionnaire B	9	11,56
	Total	20	

Test Statistics^{a,b}

	Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic)	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
Chi-square	,058	,114	,828	,005	,065	1,662	,042	,537
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,810	,736	,363	,943	,799	,197	,838	,463

b. Grouping Variable: Questionnaire

Appendix 9-13: H3, Kruskal-Wallis test results, male IT-professionals

	Questionnaire	N	Mean Rank
Q2.1 (convincement)	Questionnaire A	8	7,06
	Questionnaire B	6	8,08
	Total	14	
Q3.1 (operational efficiency)	Questionnaire A	8	6,81
	Questionnaire B	6	8,42
	Total	14	
Q3.2 (no gains for mobile workers)	Questionnaire A	8	8,94
	Questionnaire B	6	5,58
	Total	14	
INVERTED Q3.2 (no gains for mobile workers)	Questionnaire A	8	6,06
	Questionnaire B	6	9,42
	Total	14	
Q3.3 (important in risk management)	Questionnaire A	8	8,19
	Questionnaire B	6	6,58
	Total	14	
Q3.4 (achievement of benefits)	Questionnaire A	8	6,13
	Questionnaire B	5	8,40
	Total	13	
Q3.5 (willingness to take risks)	Questionnaire A	8	6,63
	Questionnaire B	6	8,67
	Total	14	

Test Statistics^{a, b}

	Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingness to take risks)
Chi-square	,239	,538	2,514	2,514	,554	1,083	,872
df	1	1	1	1	1	1	1
Asymp. Sig.	,625	,463	,113	,113	,457	,298	,350

a. Kruskal Wallis Test

Ranks

Questionnaire		N	Mean Rank
Q4.1 (consolidation & virtualization)	Male	22	19,41
	Female	12	14,00
	Total	34	
Q4.2 (solutions for mobile employees)	Male	22	17,55
	Female	12	17,42
	Total	34	
Q4.3 (Solutions for business continuity)	Male	22	17,20
	Female	11	16,59
	Total	33	
Summed	Male	22	17,86
	Female	12	16,83
	Total	34	

Test Statistics^{a,b}

	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)	Summed
Chi-square	2,566	,001	,033	,086
df	1	1	1	1
Asymp. Sig.	,109	,969	,857	,770

a. Kruskal Wallis Test

Ranks

Questionnaire		N	Mean Rank
Q5.1 (optimistic)	Male	22	19,00
	Female	12	14,75
	Total	34	
Q5.2 (satisfied)	Male	22	19,27
	Female	12	14,25
	Total	34	
Q5.3 (enthusiastic)	Male	21	18,05
	Female	12	15,17
	Total	33	
Summed	Male	22	18,55
	Female	11	13,91
	Total	33	
Q5.4 (helpless)	Male	22	16,64
	Female	11	17,73
	Total	33	
Q5.5 (worried)	Male	22	17,73
	Female	12	17,08
	Total	34	
Q5.6 (frustrated)	Male	22	15,61
	Female	12	20,96
	Total	34	
Summed	Male	20	15,00
	Female	11	17,82
	Total	31	

Test Statistics^{a,b}

	Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic)	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
Chi-square	1,518	2,123	,711	1,706	,098	,034	2,393	,694
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,218	,145	,399	,191	,755	,853	,122	,405

a. Kruskal Wallis Test

Appendix 9-14: H3, Kruskal-Wallis test results, female IT-professionals

Ranks			
	Questionnaire	N	Mean Rank
Q2.1 (convincement)	Questionnaire A	4	5,00
	Questionnaire B	4	4,00
	Total	8	
Q3.1 (operational efficiency)	Questionnaire A	4	4,50
	Questionnaire B	4	4,50
	Total	8	
Q3.2 (no gains for mobile workers)	Questionnaire A	4	4,00
	Questionnaire B	4	5,00
	Total	8	
INVERTED Q3.2 (no gains for mobile workers)	Questionnaire A	4	5,00
	Questionnaire B	4	4,00
	Total	8	
Q3.3 (important in risk management)	Questionnaire A	4	4,25
	Questionnaire B	4	4,75
	Total	8	
Q3.4 (achievement of benefits)	Questionnaire A	4	4,25
	Questionnaire B	4	4,75
	Total	8	
Q3.5 (willingess to take risks)	Questionnaire A	4	4,25
	Questionnaire B	4	4,75
	Total	8	

Test Statistics^{a,b}

	Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingess to take risks)
Chi-square	,354	,000	,359	,359	,100	,109	,089
df	1	1	1	1	1	1	1
Asymp. Sig.	,552	1,000	,549	,549	,752	,741	,766

a. Kruskal Wallis Test

Ranks			
	Questionnaire	N	Mean Rank
Q4.1 (consolidation & virtualization)	Questionnaire A	4	4,38
	Questionnaire B	4	4,63
	Total	8	
Q4.2 (solutions for mobile employees)	Questionnaire A	4	4,50
	Questionnaire B	4	4,50
	Total	8	
Q4.3 (Solutions for business continuity)	Questionnaire A	4	3,25
	Questionnaire B	4	5,75
	Total	8	
Summed	Questionnaire A	4	3,25
	Questionnaire B	4	5,75
	Total	8	

Test Statistics ^{a,b}				
	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)	Summed
Chi-square	,024	,000	2,431	2,303
df	1	1	1	1
Asymp. Sig.	,877	1,000	,119	,129

a. Kruskal Wallis Test

Ranks

	Questionnaire	N	Mean Rank
Q5.1 (optimistic)	Questionnaire A	4	4,75
	Questionnaire B	4	4,25
	Total	8	
Q5.2 (satisfied)	Questionnaire A	4	5,00
	Questionnaire B	4	4,00
	Total	8	
Q5.3 (enthusiastic)	Questionnaire A	4	4,75
	Questionnaire B	4	4,25
	Total	8	
Summed	Questionnaire A	3	5,00
	Questionnaire B	4	3,25
	Total	7	
Q5.4 (helpless)	Questionnaire A	4	3,63
	Questionnaire B	3	4,50
	Total	7	
Q5.5 (worried)	Questionnaire A	4	4,25
	Questionnaire B	4	4,75
	Total	8	
Q5.6 (frustrated)	Questionnaire A	4	4,13
	Questionnaire B	4	4,88
	Total	8	
Summed	Questionnaire A	3	3,00
	Questionnaire B	4	4,75
	Total	7	

Test Statistics^{a, b}

	Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic)	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
Chi-square	,090	,359	,090	1,167	,286	,089	,199	1,167
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,765	,549	,765	,280	,593	,766	,655	,280

a. Kruskal Wallis Test

Appendix 9-15: H3, Kruskal-Wallis test results, males, questionnaire version

Ranks

Questionnaire		N	Mean Rank
Q2.1 (convincement)	Questionnaire A	27	24,41
	Questionnaire B	22	25,73
	Total	49	
Q3.1 (operational efficiency)	Questionnaire A	27	24,89
	Questionnaire B	22	25,14
	Total	49	
Q3.2 (no gains for mobile workers)	Questionnaire A	27	26,85
	Questionnaire B	22	22,73
	Total	49	
INVERTED Q3.2 (no gains for mobile workers)	Questionnaire A	27	23,15
	Questionnaire B	22	27,27
	Total	49	
Q3.3 (important in risk management)	Questionnaire A	27	27,74
	Questionnaire B	22	21,64
	Total	49	
Q3.4 (achievement of benefits)	Questionnaire A	27	21,83
	Questionnaire B	21	27,93
	Total	48	
Q3.5 (willingess to take risks)	Questionnaire A	27	22,57
	Questionnaire B	22	27,98
	Total	49	

Test Statistics^{a,b}

	Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingess to take risks)
Chi-square	,121	,004	1,153	1,153	2,437	2,349	1,825
df	1	1	1	1	1	1	1
Asymp. Sig.	,728	,949	,283	,283	,119	,125	,177

a. Kruskal Wallis Test

Ranks

	Questionnaire	N	Mean Rank
Q4.1 (consolidation & virtualization)	Questionnaire A	27	21,81
	Questionnaire B	22	28,91
	Total	49	
Q4.2 (solutions for mobile employees)	Questionnaire A	27	24,24
	Questionnaire B	22	25,93
	Total	49	
Q4.3 (Solutions for business continuity)	Questionnaire A	27	23,61
	Questionnaire B	22	26,70
	Total	49	
Summed	Questionnaire A	25	22,02
	Questionnaire B	22	26,25
	Total	47	

Test Statistics^{a, b}

	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)	Summed
Chi-square	3,197	,185	,607	1,137
df	1	1	1	1
Asymp. Sig.	,074	,667	,436	,286

a. Kruskal Wallis Test

Ranks

	Questionnaire	N	Mean Rank
Q5.1 (optimistic)	Questionnaire A	27	23,74
	Questionnaire B	22	26,55
	Total	49	
Q5.2 (satisfied)	Questionnaire A	27	23,13
	Questionnaire B	22	27,30
	Total	49	
Q5.3 (enthusiastic)	Questionnaire A	27	23,80
	Questionnaire B	21	25,40
	Total	48	
Summed	Questionnaire A	25	23,04
	Questionnaire B	22	25,09
	Total	47	
Q5.4 (helpless)	Questionnaire A	27	24,43
	Questionnaire B	22	25,70
	Total	49	
Q5.5 (worried)	Questionnaire A	27	24,56
	Questionnaire B	22	25,55
	Total	49	
Q5.6 (frustrated)	Questionnaire A	27	27,24
	Questionnaire B	22	22,25
	Total	49	
Summed	Questionnaire A	26	24,42
	Questionnaire B	20	22,30
	Total	46	

	Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic)	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
Chi-square	,498	1,070	,161	,265	,102	,061	1,577	,288
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,480	,301	,688	,607	,749	,805	,209	,591

a. Kruskal Wallis Test

Appendix 9-16: H3, Kruskal-Wallis test results, females, questionnaire version

Ranks			
Questionnaire	N	Mean Rank	
Q2.1 (convincement)	Questionnaire A	9	12,83
	Questionnaire B	12	9,63
	Total	21	
Q3.1 (operational efficiency)	Questionnaire A	9	12,33
	Questionnaire B	12	10,00
	Total	21	
Q3.2 (no gains for mobile workers)	Questionnaire A	9	9,06
	Questionnaire B	12	12,46
	Total	21	
INVERTED Q3.2 (no gains for mobile workers)	Questionnaire A	9	12,94
	Questionnaire B	12	9,54
	Total	21	
Q3.3 (important in risk management)	Questionnaire A	9	10,33
	Questionnaire B	12	11,50
	Total	21	
Q3.4 (achievement of benefits)	Questionnaire A	9	9,61
	Questionnaire B	12	12,04
	Total	21	
Q3.5 (willingness to take risks)	Questionnaire A	9	10,50
	Questionnaire B	12	11,38
	Total	21	

Test Statistics ^{a, b}							
	Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingness to take risks)
Chi-square	1,437	,922	1,751	1,751	,215	,986	,109
df	1	1	1	1	1	1	1
Asymp. Sig.	,231	,337	,186	,186	,643	,321	,742

a. Kruskal Wallis Test

Ranks

	Questionnaire	N	Mean Rank
Q4.1 (consolidation & virtualization)	Questionnaire A	9	12,67
	Questionnaire B	12	9,75
	Total	21	
Q4.2 (solutions for mobile employees)	Questionnaire A	9	12,00
	Questionnaire B	12	10,25
	Total	21	
Q4.3 (Solutions for business continuity)	Questionnaire A	9	9,83
	Questionnaire B	11	11,05
	Total	20	

	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)	Summed
Chi-square	1,254	,472	,245	,005
df	1	1	1	1
Asymp. Sig.	,263	,492	,620	,943

a. Kruskal Wallis Test

Ranks

	Questionnaire	N	Mean Rank
Q5.1 (optimistic)	Questionnaire A	9	10,72
	Questionnaire B	12	11,21
	Total	21	
Q5.2 (satisfied)	Questionnaire A	9	11,94
	Questionnaire B	12	10,29
	Total	21	
Q5.3 (enthusiastic)	Questionnaire A	9	11,33
	Questionnaire B	12	10,75
	Total	21	
Summed	Questionnaire A	8	10,19
	Questionnaire B	11	9,86
	Total	19	
Q5.4 (helpless)	Questionnaire A	9	10,11
	Questionnaire B	11	10,82
	Total	20	
Q5.5 (worried)	Questionnaire A	9	11,39
	Questionnaire B	12	10,71
	Total	21	
Q5.6 (frustrated)	Questionnaire A	9	10,61
	Questionnaire B	12	11,29
	Total	21	
Summed	Questionnaire A	6	7,83
	Questionnaire B	11	9,64
	Total	17	

Test Statistics^{a, b}

	Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic) c	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
Chi-square	,034	,431	,048	,016	,076	,066	,067	,510
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,853	,512	,826	,901	,783	,798	,795	,475

a. Kruskal Wallis Test

Appendix 9-17: H3, Kruskal-Wallis test results, questionnaire A respondents, gender

Ranks

Sex		N	Mean Rank
Q2.1 (convincement)	Male	27	18,06
	Female	9	19,83
	Total	36	
Q3.1 (operational efficiency)	Male	27	18,30
	Female	9	19,11
	Total	36	
Q3.2 (no gains for mobile workers)	Male	27	18,94
	Female	9	17,17
	Total	36	
INVERTED Q3.2 (no gains for mobile workers)	Male	27	18,06
	Female	9	19,83
	Total	36	
Q3.3 (important in risk management)	Male	27	19,26
	Female	9	16,22
	Total	36	
Q3.4 (achievement of benefits)	Male	27	18,37
	Female	9	18,89
	Total	36	
Q3.5 (willingess to take risks)	Male	27	18,28
	Female	9	19,17
	Total	36	

Test Statistics^{a, b}

	Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingess to take risks)
Chi-square	,219	,048	,218	,218	,638	,017	,052
df	1	1	1	1	1	1	1
Asymp. Sig.	,640	,826	,640	,640	,425	,895	,820

a. Kruskal Wallis Test

Ranks

	Sex	N	Mean Rank
Q4.1 (consolidation & virtualization)	Male	27	17,33
	Female	9	22,00
	Total	36	
Q4.2 (solutions for mobile employees)	Male	27	17,59
	Female	9	21,22
	Total	36	
Q4.3 (Solutions for business continuity)	Male	27	18,43
	Female	9	18,72
	Total	36	
Summed	Male	25	16,90
	Female	9	19,17
	Total	34	

Test Statistics^{a,b}

	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)	Summed
Chi-square	1,428	,864	,006	,352
df	1	1	1	1
Asymp. Sig.	,232	,353	,939	,553

Ranks

	Sex	N	Mean Rank
Q5.1 (optimistic)	Male	27	19,33
	Female	9	16,00
	Total	36	
Q5.2 (satisfied)	Male	27	18,22
	Female	9	19,33
	Total	36	
Q5.3 (enthusiastic)	Male	27	18,57
	Female	9	18,28
	Total	36	
Summed	Male	25	17,22
	Female	8	16,31
	Total	33	
Q5.4 (helpless)	Male	27	18,22
	Female	9	19,33
	Total	36	
Q5.5 (worried)	Male	27	18,56
	Female	9	18,33
	Total	36	
Q5.6 (frustrated)	Male	27	18,52
	Female	9	18,44
	Total	36	
Summed	Male	26	16,73
	Female	6	15,50
	Total	32	

Test Statistics^{a, b}

	Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic)	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
Chi-square	,720	,079	,006	,054	,080	,003	,000	,085
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,396	,779	,941	,816	,778	,955	,985	,770

a. Kruskal Wallis Test

Appendix 9-18: H3, Kruskal-Wallis test results, questionnaire B respondents, gender

Ranks			
	Sex	N	Mean Rank
Q2.1 (convincement)	Male	22	19,34
	Female	12	14,13
	Total	34	
Q3.1 (operational efficiency)	Male	22	18,32
	Female	12	16,00
	Total	34	
Q3.2 (no gains for mobile workers)	Male	22	15,09
	Female	12	21,92
	Total	34	
INVERTED Q3.2 (no gains for mobile workers)	Male	22	19,91
	Female	12	13,08
	Total	34	
Q3.3 (important in risk management)	Male	22	16,20
	Female	12	19,88
	Total	34	
Q3.4 (achievement of benefits)	Male	21	17,64
	Female	12	15,88
	Total	33	
Q3.5 (willingness to take risks)	Male	22	18,20
	Female	12	16,21
	Total	34	

	Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile workers)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingness to take risks)
Chi-square	2,333	,488	4,227	4,227	1,169	,282	,328
df	1	1	1	1	1	1	1
Asymp. Sig.	,127	,485	,040	,040	,280	,595	,567

Ranks			
	Questionnaire	N	Mean Rank
Q4.1 (consolidation & virtualization)	Male	22	19,41
	Female	12	14,00
	Total	34	
Q4.2 (solutions for mobile employees)	Male	22	17,55
	Female	12	17,42
	Total	34	
Q4.3 (Solutions for business continuity)	Male	22	17,20
	Female	11	16,59
	Total	33	

	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)	Summed
Chi-square	2,566	,001	,033	,086
df	1	1	1	1
Asymp. Sig.	,109	,969	,857	,770

Q5.1 (optimistic)	Male	22	19,00
	Female	12	14,75
	Total	34	
Q5.2 (satisfied)	Male	22	19,27
	Female	12	14,25
	Total	34	
Q5.3 (enthusiastic)	Male	21	18,05
	Female	12	15,17
	Total	33	
Summed	Male	22	18,55
	Female	11	13,91
	Total	33	
Q5.4 (helpless)	Male	22	16,64
	Female	11	17,73
	Total	33	
Q5.5 (worried)	Male	22	17,73
	Female	12	17,08
	Total	34	
Q5.6 (frustrated)	Male	22	15,61
	Female	12	20,96
	Total	34	
Summed	Male	20	15,00
	Female	11	17,82
	Total	31	

Test Statistics ^{a,b}							
Q5.1 (optimistic)	Q5.2 (satisfied)	Q5.3 (enthusiastic)	Summed	Q5.4 (helpless)	Q5.5 (worried)	Q5.6 (frustrated)	Summed
1,518	2,123	,711	1,706	,098	,034	2,393	,694
1	1	1	1	1	1	1	1
,218	,145	,399	,191	,755	,853	,122	,405
a. Kruskal Wallis Test							

Appendix 9-19: Spearman's rank correlation matrix

		Q2.1 (convincement)	Q3.1 (operational efficiency)	Q3.2 (no gains for mobile workers)	INVERTED Q3.2 (no gains for mobile)	Q3.3 (important in risk management)	Q3.4 (achievement of benefits)	Q3.5 (willingness to take risks)	Q4.1 (consolidation & virtualization)	Q4.2 (solutions for mobile employees)	Q4.3 (Solutions for business continuity)	Summed	OS.1 (optimistic)	OS.2 (satisfied)	OS.3 (enthusiastic)	Summed	OS.4 (helpless)	OS.5 (worried)	OS.6 (frustrated)	Summed	Questionnaire	Status	Age	Competence	Mindset	Student?			
Sex	Pearson Sig. (2-tailed) N	-0.07 .527 70	.020 .866 70	.231 .054 70	-.231 .054 70	.019 .873 70	.028 .522 70	-.024 .841 70	.034 .776 70	.083 .487 70	.004 .975 70	.045 .719 70	-.126 .200 70	-.058 .377 70	-.046 .707 70	-.070 .546 70	.043 .726 70	.069 .669 70	.204 .740 70	.740 .355 70	.740 .355 70	.112 .039 70	-.039 .034 70	-.034 .034 70	-.037 .034 70	-.172 .194 70	-.094 .439 70		
Q2.1 (convincement)	Pearson Sig. (2-tailed) N																												
Q3.1 (operational efficiency)	Pearson Sig. (2-tailed) N																												
Q3.2 (no gains for mobile workers)	Pearson Sig. (2-tailed) N																												
INVERTED Q3.2 (no gains for mobile workers)	Pearson Sig. (2-tailed) N																												
Q3.3 (important in risk management)	Pearson Sig. (2-tailed) N																												
Q3.4 (achievement of benefits)	Pearson Sig. (2-tailed) N																												
Q3.5 (willingness to take risks)	Pearson Sig. (2-tailed) N																												
Q4.1 (consolidation & virtualization)	Pearson Sig. (2-tailed) N																												
Q4.2 (solutions for mobile employees)	Pearson Sig. (2-tailed) N																												
Q4.3 (Solutions for business continuity)	Pearson Sig. (2-tailed) N																												
Summed	Pearson Sig. (2-tailed) N																												
OS.1 (optimistic)	Pearson Sig. (2-tailed) N																												
OS.2 (satisfied)	Pearson Sig. (2-tailed) N																												
OS.3 (enthusiastic)	Pearson Sig. (2-tailed) N																												
Summed	Pearson Sig. (2-tailed) N																												
OS.4 (helpless)	Pearson Sig. (2-tailed) N																												
OS.5 (worried)	Pearson Sig. (2-tailed) N																												
OS.6 (frustrated)	Pearson Sig. (2-tailed) N																												
Summed	Pearson Sig. (2-tailed) N																												
Questionnaire	Pearson Sig. (2-tailed) N																												
Status	Pearson Sig. (2-tailed) N																												
Age	Pearson Sig. (2-tailed) N																												
Competence	Pearson Sig. (2-tailed) N																												
Mindset	Pearson Sig. (2-tailed) N																												
Student?	Pearson Sig. (2-tailed) N																												

light blue= 95% significance (two-sided), green= positive emotions

dark blue= 99% significance (two-sided), red= negative emotions