THE USAGE OF EXPERIMENTAL RESEARCH IN BUSINESS-TO-BUSINESS MARKETING CONTEXT IN ACADEMIC MARKETING JOURNALS

Master’s Thesis

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ABSTRACT

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The aim of this master’s thesis is to introduce what is experimental research and how the researcher is able to use this researching method in business-to-business context. This work has been done with analyzing articles of four academic marketing journals from years 1992-2012.

In the literature part there is introduction of the nature of the experimental research, its terminology and design. There is also discussion about limitations of experimental research and comparison of experimental research to quasi-experimental design.

In the results part there is a review how experimental research has been used in the business-to-business context in the past two decades. In the analysis there is introduction of themes, samplings, different kinds of variables and main findings. The work offers a good understanding to nature of experimental research and useful data for organizing a real experimental study.
**TIIVISTELMÄ**

**Tekijä:** Heidi Birgitta Häkkinen  
**Työn nimi:** Kokeellisen tutkimuksen käyttö teollisessa markkinoinnissa akateemisissä julkaisuissa  
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**Hakusanat:** Kokeellinen tutkimus, akateemiset julkaisut, teollinen markkinointi


Tutkimustuloksissa käydään läpi, kuinka kokeellista tutkimusta on käytetty akateemisissa julkaisuissa viimeisen kahdenkymmenen vuoden aikana. Analyysissä käydään läpi aihealueeseen soveltuvien artikkeleiden aihepiirit, otantakoot, eri muuttujat sekä artikkeleiden pääloydökset. Tutkimus kokonaisuudessaan tarjoaa ymmärryskäytännön kokeellisen tutkimuksen luonteesta sekä hyödyllistä tietoa kokeellisen tutkimuksen soveltamisesta teollisen markkinoinnin tutkimisen käyttötarpeisiin.
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ABBREVIATIONS

ANCOVA  Analysis of covariance

ANOVA  Analysis of variance

B2B  Business-to-business

B2C  Business-to-consumer

GIS  Geographical information systems

GLM  General linear modeling

IMM  Industrial Marketing Management

JAMS  Journal of Academy of Marketing Science

JM  Journal of Marketing

JMR  Journal of Marketing Research

MANOVA  Multivariate analysis of variance

OLS  Ordinary least-squares

RM  Relationship marketing
1 INTRODUCTION

This master’s thesis concentrates on the usage of experimental research in business-to-business context. Experimental research is a systematic and scientific approach to research in which the researcher manipulates one or more variables. In addition, it controls and measures any change in other variables. Business-to-business means that commerce transactions happen between businesses such as between a vendor and a buyer.

Experimental research is commonly used in sciences such as sociology and psychology. It is unique research method compared to other scientific research methods because it involves the conscious manipulation of certain aspects of a real system and the observation of the effects of the manipulation. Nowadays, it seems that it is more commonly used to discover consumer behavior than business marketing. The aim of experimental research is to find causalities between discovered variables. Experimental research helps to explain for example why effectiveness decreases in business process instead of just measure the effectiveness per year. Better business knowledge is essential to improved decision-making. Experimental research turns information into knowledge. This work helps to understand the benefits and challenges of using experimental research in business-to-business context.

This master’s thesis consists of two parts. The first part is about what is experimental research. The second part is the analysis of articles in academic marketing journals. The selected journals are Journal of Marketing, Journal of Marketing Research, Journal of the Academy of Marketing Science and Industrial Marketing Management.

This work is important because this research method is used usually in consumer business context or in other science areas. This work offers useful material for researchers to solve industrial business challenges with experimental research design. For further research, the aim of this work is to increase the usage of experimental research for doing better industrial business decisions.
1.1 Aim and limitations

The meaning of this work is to offer overview to what is experimental research and how it has been used in business-to-business context in academic marketing journals. The master thesis helps to understand how experimental research fits to business-to-business context. In addition, this work offers ways to use experimental research in business marketing. The objective of this work is to increase the using of experimental research in business-to-business context. This work offers good material for a researcher to accomplish an experimental research.

The research questions have been introduced in table 1. It is what experimental research is and how this research method can be used in industrial marketing? The aim of the first research question is to offer an overview to design of experimental research. This research question helps the reader to follow analysis of articles and understand terminology. The part introduces the nature of experimental research and how it fits to industrial business context. The chapter 2 answers to this research question.

The second research question is what kinds of industrial articles about using experimental study have been published in the selected journals in years 1992-2012? The objective of this research question is to help to understand how to solve industrial marketing challenges with experimental research methods. The second research question has two connected questions. The first one is what kind of industrial marketing subjects have been discovered with experimental research? The second one is what kind of experimental research design (sampling, variables etc.) has been used in the selected articles? The chapters 3, 4 and 5 answers to the second research question. They also answers to the research question one how this research method can be used in industrial marketing.

This work discusses only about experimental research in industrial marketing context. The experimental research has been used in many other science areas for long time. In addition, there are many academic articles of using experimental research for consumer marketing researching. Nevertheless, it seems very unusual that this research method has been used in
business-to-business context in selected articles. As a result, the limitation of this work is the sampling of the articles because of lack of the suitable articles.

**Table 1.** Research questions.

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Objectives</th>
<th>Chapter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What experimental research is and how this research method can be used in industrial marketing?</td>
<td>To introduce the nature of experimental study and how it fits to industrial business</td>
<td>2</td>
</tr>
<tr>
<td>2. What kinds of industrial articles about using experimental study have been published in the selected journals in years 1992-2012?</td>
<td>To help to understand how to solve industrial marketing challenges with experimental research methods</td>
<td>3,4,5</td>
</tr>
<tr>
<td>▪ What kind of industrial marketing subjects have been discovered with experimental research?</td>
<td></td>
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<tr>
<td>▪ What kind of experimental research design (sampling, variables etc.) has been used in the selected articles?</td>
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</table>

1.2 **Structure of the work**

The first chapter is the introduction. In the introduction part, there are introductions of aims, research questions, limitations and structure of the work. This part helps the reader to understand the meaning of this study.

The second chapter will talk about what is experimental research in general. The features of experimental research will be introduced and demonstrated how, why and when to use experimental research for research method. This helps the reader to understand the analysis of the articles better.

The third chapter will discuss about the data retrieval. The articles have been collected from four valuable academic marketing journals: Journal of Marketing, Journal of Marketing Research, Journal of the Academy of marketing Science and Industrial Marketing Management. These journals have been selected with consulting from external authority.
The fourth chapter is about analyzing the selected articles. There will be introduction of what kind of variables have been used in these articles and what kind of business problems have been solved with experimental research method. The design of the experimental studies in these articles has been tabulated carefully in this analysis part.

The fifth chapter is about summary of results. There are answers to research questions and introduction of research findings. In the end, there are limitations and suggestions for further research. The structure of the work is introduced in the table 2.

**Table 2.** The structure of the work.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Table of Content</th>
<th>Aim</th>
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<tbody>
<tr>
<td>Introduction</td>
<td>Background</td>
<td>What effort this work offer to the reader</td>
</tr>
<tr>
<td></td>
<td>Motives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Structure of work</td>
<td></td>
</tr>
<tr>
<td>Experimental research as a</td>
<td>Basic features</td>
<td>Offer basic information of this study type.</td>
</tr>
<tr>
<td>research method</td>
<td>Using</td>
<td>Helps to understand the analysis of articles</td>
</tr>
<tr>
<td>Data retrieval</td>
<td>Articles</td>
<td>Introduce the articles and journal selection</td>
</tr>
<tr>
<td></td>
<td>Using method</td>
<td></td>
</tr>
<tr>
<td>Analysis of articles</td>
<td>Comparison</td>
<td>Introduce results of analysis</td>
</tr>
<tr>
<td>Conclusion and discussion</td>
<td>Summary of the results from previous</td>
<td>Offer a synthesis of the results from the analysis and answer to</td>
</tr>
<tr>
<td></td>
<td>analysis</td>
<td>research questions</td>
</tr>
</tbody>
</table>
1.3 Key terms

In this chapter there are definitions of the main terms, which have been used in this work. Variables are the factors that the researcher can measure, control or manipulate in the research process. There are different types of variables and they are often sorted to numerical or non-numerical variables. Types include independent, fixed, random, dependent and confounding variables. (Gavin, 2008, p. 43) In addition, the terms sample and population have been defined in this chapter.

1.3.1 Independent variable

Independent variables are those that could have an effect on other variables (Gavin, 2008, p. 43). This is the factor manipulated by the researcher, and it produces one or more results. There are usually only one or two independent variables tested in an experiment because it is difficult to determine the influence of each upon the final results. In addition, a well-designed experiment incorporates independent variables with every other possible factor eliminated or controlled. The confusing name comes from the issue that the variable is isolated from any other factor. In addition, it allows experimental manipulation to establish analyzable results. For a simple example, an experiment to test the effects of a certain fertilizer, upon plant growth, may measure height, number of fruits etc. All of these are valid analyzable factors, arising from the manipulation of independent variable, which is amount of fertilizer. (Shuttleworth, 2008)

1.3.2 Dependent variable

Dependent variable is one that might be affected by the variations of the independent variable (Gavin, 2008, p. 44). In any true-experiments, a researcher manipulates an independent variable for that the researcher could influence a dependent variable or variables. There may be more than several dependent variables. The reason is that manipulating the independent variable can influence many different things. For example, a researcher needs to discover the effect of temperature on the rate of plant growth. In this case, independent variable is temperature and dependent variables are for example weight, height and number of fruits. A whole range of dependent variables arises from one independent variable. The researcher
must determine that there is a definite causality between the independent and dependent variable. (Shuttleworth, 2008)

1.3.3 Population and samples

In research, population means also objects, events, procedures or observations. Thus a population is an aggregate of things. Samples are part of population. Even if a population can be defined, it will usually contain too many individuals to discover. For that reason, research investigation is commonly confined to one or more samples drawn from it. A good sample will contain the information that the population does, so there must be an effective relation between the sample and the population. One way of providing that thing is to ensure that everyone in the population has a known chance of being included in the sample. In addition, it seems reasonable to make these chances equal. The researcher wants to be certain that the inclusion of one population member does not affect the chance of others being included. So the choice is made by some element of chance or in large populations and samples by use of tables of random numbers. (Gavin, 2008, p. 42-43)

1.3.4 Random and fixed variable

With a variable that has many values the researcher would not necessarily wish to use every value. Besides, the researcher could not randomly select values from it. A random selection of groups does not necessarily give to researcher the structure what is needed for the independent variable. In addition, the researcher would prefer to use a fixed set for variables. (Gavin, 2008, p. 44) A fixed variable is one where the researcher has specific set values for the independent variable included in the study. (Gavin, 2008, p. 43)

1.3.5 Control variable and confounding variable

Control variables are used to reduce the possibility of any other factor influencing changes in the dependent variable. This variable is used to reduce the effects of confounding variables. A confounding variable, also known as a third variable or a mediator variable, can adversely affect the relation between the independent variable and dependent variable. This may cause the researcher to analyze the results incorrectly. In other words, confounding variables are
variables that the researcher failed to control or eliminate, damaging the internal validity of an experiment. (Shuttleworth, 2008) In some cases, control variables can affect the outcome. Nevertheless, these variables are not strictly part of the study. The researcher controls these variables. (Gavin, 2008, p. 44) A failure to isolate the controlled variables will seriously compromise the internal validity. Lack of control variables may ruin the experiment, waste time and resources and damage the researcher’s reputation. Most experimental designs measure only one or two variables at a time. Any other factor, which could potentially influence the results, needs to be correctly controlled. The effect of other factors must be standardized or eliminated, exerting the same influence upon the different sample groups. For example, when comparing cleaning product brands together, the independent variable is brand and controlled variable is for example the type of dirt. (Shuttleworth, 2008)
2 EXPERIMENTAL RESEARCH AS A RESEARCH METHOD

According to Kotler and Keller (2006) the most scientifically valid research is experimental research. Experimentation has the elements of observation, inference, control and comparison. Purpose of the experimental study is to indicate causation between the two factors. Experimental study has a high qualitative value especially in studies where the meaning of study is to research causations between factors and analyze results carefully. (Gavin, 2008, p. 8, Metsämuuronen, 2005, p. 6-7) The marketing managers can have confidence in the conclusions by making sure that the design and execution of the experiment eliminate alternative hypotheses that might explain the results (Kotler and Keller, 2006, p. 106).

Experiments include control, manipulation and replicability. Still, they are concerned with unobservable processes and events. The researcher need to be very careful about recording what is the observation object and must control the variables when carrying the experiments. (Gavin, 2008, p. 12) Experimentation has the elements of observation, inference, control and comparison. (Gavin, 2008, p. 8, Metsämuuronen, 2005, p. 6-7) In other words, the researcher carefully controls conditions and takes measurements in order to discover relations among variables. A variable is something that can occur with different values. The ability to exercise precise control over variables distinguishes the experimental method from other methods of scientific observation. (Atkinson et al., 1996, p. 17) According to Gavin (2008, p. 48-49), the researcher needs to make sure that the research has replicability, reliability and external validity. A research is only replicable if the researcher can share the method process with other researchers and the other researchers are able to repeat the study in the same way and will get similar results. Reliability means that for example research findings need to be stable and/or repeatable and unbiased.

This chapter will answer to the first research question what is experimental research. Experimental study can be seen as a research process. The researcher must have some hypothesis about the subject and define the variables (dependent variable, independent variable, control variable). The study design is like a map for the study. It is important to understand analysis of the experimental study to handle information from the study. Next, experimental research will be introduced in general.
2.1 Key characteristics of experimental research

Experimental research bases on manipulation of an independent variable. The researcher tries to hold all the other variables except the dependent variable. The independent variable is some aspect of the experimental situation that the researcher manipulates in order to see if it causes a change in some other behaviour. The dependent variable is some aspect of behaviour that is affected by the action of the independent variable in an experiment. An experimental effect is produced if the independent variable causes a change in the dependent variable. The meaning of experimental control is to predict events that will occur in the experimental setting by neutralizing the effects of other factors. (Cardwell, 1999, p. 69-122) According to Creswell (2008) the key ideas of experimental research are random assignment, control of extraneous variables, manipulation of treatment, measurement of outcomes, comparison of participant groups and possible threats of validity. In figure 1 is introduced classic experimental design.

![Figure 1. Classic experimental design. (Coolican, 2004, p. 59)](image-url)
Meaning of experiments is to collect data about well-defined phenomenon from well-observant circumstance. Types of experiments are laboratory experiment and field experiment. Experimental research is quantitative way to discover. It means that the data represents universe statistically. The data collection, treatment and analyzing process are separated from each other. The data is strictly limited and can be introduced by numbers. The experiment can be replicated and validity and reliability are very important to experimental research. The nature of experimental research is to question the existing theory. (Uusitalo, 2001, p. 64-81)

According to Kerlinger (1986, p. 299) there are two important principles in experimental research. The one is that the researcher should randomize whenever possible. It means that the researcher should select subjects at random, assign subjects to groups at random and assign experimental treatments to groups at random. In addition, the other one is that the researcher should control the independent variables so that extraneous and unwanted sources of systematic variance have minimal opportunity to operate.

2.1.1 Manipulation of an independent variable

The manipulation of one or more independent variables is necessary for inferring causality (Kirk, 2013, p. 6). In experimental research, the researcher manipulates one of the variables. The manipulation means that the researcher actually changes the value of this variable in a systematic way. This variable is called independent variable. The independent variable is the variable that the researcher believes to be the cause. The different values or levels of independent variable are also called conditions. (Kerlinger, 1986, p. 32; Gravetter and Forzano, 2012, p. 594) Levels of independent variable are the different values of the independent variable selected to create and define the treatment conditions (Gravetter and Forzano, 2012, p. 594)

There are two types of independent variable. Quantitative independent variable is when different treatment levels have different amounts of the independent variable. When the independent variable is quantitative the levels of the variable are generally chosen so that they are equally spaced. Typically there is little interest in the exact values of the treatment levels used in the experiment. It is important that treatment levels cover a sufficiently wide range so
that the effects of the independent variable can be detected if these effects exist. Moreover, the number and spacing of the levels should be sufficient to define the shape of the function that is part of the independent and dependent variables. The other type of independent variable is qualitative independent variable. It is usable when the treatment has different levels. The different levels represent different kinds rather than different amounts of the independent variable. Qualitative independent variable are descriptive and quantitative independent variable are measurable. (Kirk, 2013, p. 3-4)

There are three ways to manipulate independent variable. The first way is to manipulate it by presenting a condition or treatment to one group and withholding the condition or treatment from another group. This is called the presence or absence technique. (Atkinson et al., 1996, p. 19) The second one is that the researcher can manipulate independent variable by varying the amount of a condition or variable. This is called the amount technique. The third way is to manipulate the independent variable by varying the type of the treatment administered. This one is called the type technique. (Dr. Price & Dr. Oswald, 2006)

According to Cozby and Bates (2011), the researcher can usually manipulate an independent variable with relative simplicity by presenting written, verbal or visual material to the participants. These are called straightforward manipulations. Straightforward manipulations manipulate variables with instructions and stimulus presentations. Stimuli may be presented verbally, in written form, via videotape or with a computer. Most of manipulations of independent variables in all areas of experimental research are straightforward. The other type of manipulation is staged manipulations. Sometimes it is necessary to stage events during the experiment in order to manipulate the independent variable successfully. The manipulation is then called a staged manipulation or event manipulation. Benefits of this manipulation type are that the researcher may be trying to create some psychological state in the participants. Secondly, a staged manipulation may be necessary to simulate some situation from real world.

2.1.2 Control of extraneous variables

Extraneous variable is any variable that exists within a research other than the independent and dependent variables. (Gravetter and Forzano, 2012, p. 592) So, extraneous variables are
basically all variables other than those the researcher is interested to research. Usually these variables are seen as nuisance variables that interfere with interpretations of results and can be avoided by more careful design, attention to procedures, materials etc. However, these unwanted variables can lead to dramatic research development. (Coolican, 2004, p. 91) To control extraneous variables means that the researcher minimizes, nullifies or isolates the influences of independent variables extraneous to the purposes of the study. (Kerlinger, 1986, p. 287-289) According to Kotler and Keller (2006, p. 106), to make sure that extraneous factors are eliminated or controlled, the observed effects can be related to the variations in the treatments. Next there is introduction of the five ways to control extraneous variables in experimental research.

There are several ways to control extraneous variables. The first one is to eliminate the variable as a variable. This control method is the easiest if it is possible to do. The researcher can eliminate the effect of a possible influential independent variable on a dependent variable by choosing subjects so that they are as homogeneous as possible on that independent variable. This method of controlling unwanted or extraneous variance is very effective. The second way to control extraneous variance is through randomization. Theoretically, this way is the only method of controlling all possible extraneous variables. This method bases on the idea that if randomization has been accomplished, then the experimental groups can be considered statistically equal in all possible ways. This does not mean that the groups are equal in all the possible variables. The control of the extraneous variance by randomization is a powerful method of control. (Kerlinger, 1986, p. 287-288)

The third way to control these variables is to build them right into the design as an independent variable. The researcher can control an extraneous variable by building it into the research design as an attribute variable. The researcher can do this by achieving control and yielding additional research information about the effect of the variable on the dependent variable and about its possible interaction with other independent variables. The fourth way to control extraneous variance is to match subjects. The basic principle to use this method is to split a variable into two or more parts and then randomize within each level. It is important to notice that when a matching variable is substantially correlated with the dependent variable, matching as a form of variance control can be profitable and desirable. However, there are some limitations on matching such as the subjects, which are matched must be substantially
related to the dependent variable or the matching is a waste of time. The fifth way to control is statistical control. These methods are forms of control in the sense that they isolate and quantify variances. Statistical control is inseparable from other forms of design control, for example matching. (Kerlinger, 1986, p. 288-289)

2.1.3 Nuisance variables

Nuisance variables are a variation from undesired sources in an experiment and they affect the dependent variable. They are extraneous variables, which do not systematically differ between the levels of the independent variable. They are not confounding variables. There are many potential sources of nuisance variables for example environmental factors. If the researcher doesn’t control them they can affect the outcome of an experiment. The effect of a nuisance variable can take several forms. (Kirk, 2013, p. 5)

Bias is one of these effects. Bias systematically distorts results in a particular direction. (Kirk, 2013, p. 5) According to Cardwell (1999), bias is a tendency to treat one individual or group differently from others. Bias can be positive or negative. Positive bias shows favourable behaviour toward the recipient of the bias and negative bias shows unfavourable behaviour toward them. (Cardwell, 1999, p. 30).

In addition, nuisance variable can increase the variability of the phenomenon. Error variance is variability among observations that cannot be attributed to the effects of the independent variable. The worst influence of nuisance variable is that it systematically distorts results in a particular direction and increases the error variance in the same time. (Kirk, 2013, p. 5)

2.1.4 Confounding variables

The power of the experimental research rests on its ability to ensure that only the independent variable is permitted to vary systematically across the conditions of the experiment. If there is one or more other variables unintentionally vary alongside the manipulated variable, the results is confounding. Confounding variables can render an experiment useless. (Breakwell et al., 2006, p. 74) Confounding variables refer to the possible influence of other uncontrolled
factors on the behavior being measured in an experiment. (Cardwell, 1999, p. 54) According to Coolican (2004, p. 58), confounding variables are differences between conditions, other than the levels of the independent variable that could account for observed differences in the dependent variable. A confounding variable, also known as a third variable or a mediator variable, can adversely affect the relation between the independent variable and dependent variable. Some confounding variables are obvious while others are far more subtle. The more closely related the confounding variable is to the independent variable the more serious are the consequences. The researcher should check for possible confounding variables before running the experiment because afterwards the experiment is already ruined. (Breakwell et al., 2006, p. 74)

According to Gravetter and Forzano (2012, p. 591) confounding variable is an extraneous variable that is allowed to change systematically along with the two variables being studied. These variables are usually unmonitored. In the context of an experiment, these variables change systematically along with the independent variable and have the potential to influence the dependent variable. A confounding variable provides an alternative explanation for the observed relationship and therefore is a threat to internal validity.

The relation may cause the researcher to analyze the results incorrectly. In other words, confounding variables are variables that the researcher failed to control or eliminate, damaging the internal validity of an experiment. (Shuttleworth, 2008) The average level of the confounding variable varies across conditions and that is the greatest problem with these kinds of variables. In other words, an extraneous variable that differs systematically across conditions is called confounding variable. (Coolican, 2004, p. 91)

By Coolican (2004, p. 91), confounding variables can lead the research to wrongly identify the causal component of an independent variable. Besides, The researcher may assume the intended independent variable has an effect when it doesn’t. In addition, the researcher may assume that an effect doesn’t occur when it does.
2.1.5 Establishing cause and effect

According to Cardwell (1999), cause and effect is a belief that a cause can be established for every event. The independent variable that is manipulated in an experiment is hypothesized as the cause and the dependent variable is the effect. (Cardwell, 1999, p. 41) According to Shuttleworth (2008), the basic principle of causality is determining whether the results and trends seen in an experiment are really caused by the manipulation or whether some other factor underlies the process. The most important thing of establishing cause and effect is proving that the effects seen in the experiment happened after the cause. It is very simple issue but it is surprisingly hard to verify which factor happened first. For this reason, the causality is one of most difficult aspects of scientific research. The other problem is to isolate and neutralize the influence of confounding variables. So it is difficult for the researcher to state that the treatment is the only cause. (Shuttleworth, 2008)

When establishing causality it is important to notice that it is impossible to establish complete causality. However, every researcher needs to ensure that the experimental design is strong and well-considered, containing pilot studies to establish cause and effect before plowing on with a complex and expensive research. The temporal factor is usually the easiest aspect to neutralize, because most experiments involve administering a treatment and then observing the effects, giving a linear temporal relationship. One of the biggest threats to internal validity through incorrect application of cause and effect is the history threat. This means that between starting and finishing the study time has gone forward and the test group has maybe learned something new after starting the test. This phenomenon can be eliminated with influenced control group also learning the same new things. (Shuttleworth, 2008)

Social threats are a big problem for social researchers because they are one of the most difficult of the threats to minimize. These types of threats arise from issues within the participant groups or the researchers themselves. (Shuttleworth, 2008) These threats arise when test people will react also to what is happening to others around them and it affects to them also (Gavin, 2008, p. 46). According to Gavin (2008), other error in design is that the researcher tests only one group of people or several groups of people who may not be comparable.
According to Shuttleworth (2008), there are four kinds of types of social threats. First one is diffusion or imitation of treatment. This happens when information travels between test and control groups and the other group knows something else than the first tested group. Second one is compensatory rivalry. This means that sometimes the control group becomes jealous of the test group. The problem is that the control group may try to be as good as the test group. Third one is demoralization and resentment. This means that the control group can also give up and this group does not bother trying their best. This can cause that the test group seems to be better than the control group. The fourth one is compensatory equalization of treatment. This threat arises from the attitude of the researchers or external contributors. For example, the employee and the manager are in same group and the researcher will treat more agreeable the manager than the employee. (Shuttleworth, 2008)

Multiple group threats are a danger to causality caused by differences between two or more groups of participants. The main example of this is selection bias or assignment bias where the two groups are assigned unevenly. This will skew the results and hide the effects of the entire experiment. The only way to reduce the influence of multiple group threats is through randomization, matched pairs designs or another assignment type. As a result, establishing cause and effect is one of the most important factors in designing a robust research experiment. (Shuttleworth, 2008)

### 2.2 Random sampling

Random sampling means that each member of the population under study has the same chance of being selected. (Cardwell, 1999, p. 202) Kerlinger (1986) offers a definition that random sampling is that method of drawing a sample of a population or universe so that all possible samples of fixed size n have the same probability of being selected (Kerlinger, 1986, p. 110). The aim of random assignment is to eliminate other variables as explanations for the observed difference. Random assignment is the best way to control because by randomly forming groups, the groups may be probably equated on all known and unknown variables at the start of the experiment. Random assignment helps the researcher to produce internal validity and random selection helps to produce external validity. The difficulty of clearly explaining the outcome of research varies inversely with the degree of control that comes through randomization. (Kirk, 2013, p. 6-7)
It is typical for experimental research that the researcher is active to sort observation parts to different kinds of groups. In addition, the groups can be sorted because of test circumstances and test setups. These groups are called test groups and control groups. (Metsämuuronen, 2005, p. 7) Test group means those participants in an experiment who receive the independent variable under research. Control group is a group of participants. It is matched as closely as possible to the test group, that does not receive the independent variable. If the performance of the test group is significantly different from that of the control group the researcher can attribute the difference to the effect of the independent variable. (Cardwell, 1999, p. 59-94)

In good experimental design, it is possible to compare two groups of data. To do this the researcher needs to setup the two test conditions in the best way possible. In other words, the two test conditions need to be exactly the same except for the manipulation that the researcher carries out during the testing. The major difference in the two test conditions is that different people might carry them out. One way of counteracting this is to carry out both sets of data collection by the same people, but this is not always possible. The other way of minimizing the individual differences is to randomly allocate people to each of the conditions. (Gavin, 2008, p. 12)

So, the researcher needs to make a distinction between random selection and random allocation or assignment. Random selection means that the researcher has selected people to take part in the experiment from a group and has chosen those people using randomization method. Random allocation means that the researcher has taken the group of people and split them into the required number of groups using some randomization process. In addition, it means that everyone in the sample has an equal chance of being in one or other of the groups. It is possible to have both of these elements or one without the other. (Gavin, 2008, p. 12-13)

For example, there are 1500 persons in a firm. The researcher could not discover all people in this firm. The researcher is keen on to find out strategic opinions of manager stage. The researcher will select 150 managers from the department by including every third person from each department. This is called random selection. Then, the researcher has 150 managers and need to allocate them one of two groups.
2.2.1 Test group and control group

There are three different kinds of symbols to share test persons to the groups. If test persons are chosen randomly the symbol is R (random). If test persons aren’t randomized or matched the test groups are more or less similar. These groups are called non-equivalent groups and the symbol is N. Test groups can be also cut-off from others from borderline or focus place. Then the symbol is C (Cut-off). (Atkinson et al., 1996, p. 18)

Here is an example from test design (figure 2):

R     O    X    O
R     O           O

Figure 2. An example of test design in experimental study. (Atkinson et al., 1996)

In figure 2 there are two groups. The first one is the test group and the second one control group. The control group is one of the simplest forms of control to eliminate alternative explanations. In control group, the participants do not receive the treatment thought to produce change in the dependent variable. The control group offers a comparison to the performance of the test group in order to see whether, with the treatment, there is a effect or not. (Coolican, 2004, p. 59)

Both groups have been chosen randomly (R). Only the test group will be tested by test influence (X). The measuring will be done before and after influence to the both groups. (Metsämuuronen, 2005, p. 10) In other words, the simplest experimental designs are those in which the researcher manipulates one independent variable and studies its effect on one
dependent variable. Because everything is held constant except the independent variable, at the end of the experiment a statement can be for example “with everything else constant, when X is increased, Y also increases”. In other cases, “when X is increased, Y decreases”. (Atkinson et al., 1996, p. 19)

The measure factor is marked as symbol of O in the designs. It is called independent variable and it is independent of what the subject does. Cause factor is marked as X. This factor can be for example a treatment or a program. It is called dependent variable because its values ultimately depend on the values of the independent variable. The independent variable is the variable that the experimenter manipulates, and the dependent variable is the variable the experimenter observes. (Atkinson et al., 1996, p. 18)

Sometimes an experiment focuses only on the influence of a single condition, which can be either present or absent. Absence is an independent variable with two values, present or absent. The experimental design calls for an experimental group with the condition present and control group with condition absent. Limiting the research to only one independent variable is too restrictive for some problems. It may be necessary to study how several independent variables interact to produce an effect on one or several dependent variables. Studies involving simultaneous manipulation of several variables are called multivariate experiments. (Atkinson et al., 1996, p. 19)

A researcher using the experimental method usually finds it necessary to make statements about amounts or quantities. Sometimes the variables can be measured by physical means. Experiments usually involve making measurements on not just one subject, but on a sample of many subjects. The outcome of the research is data in the form of a set of numbers that must be summarized and interpreted. To finish this task, one needs to use statistics, the discipline that deals with sampling data from a population of individuals from that sample. Statistics plays an important role in experimental research. (Atkinson et al., 1996, p. 19)

The most common statistic is the mean, which is the technical term for an arithmetic average. It is the sum of a set of scores divided by the number of scores. In studies involving an experimental and control group, there are two means to be compared: a mean for the scores of the subjects in the experimental group, and a mean for the scores of the subjects in the control
group. The statistical test indicates that the difference observed is due to the effect of the independent variable rather than an unlucky accident of chance factors or a few extreme cases. (Atkinson et al., 1996, p. 19-20)

2.3 Classification of experiments

The experiments include selecting matched groups of subjects, subjecting them to different treatments, controlling extraneous variables and checking whether observed response differences are statistically significant. An experiment involves the manipulation of an independent variable in order to see how it affects on a dependent variable. In other words, a researcher will manipulate some aspect of the situation and then observe the effect that this has on some aspect of behaviour. (Kotler and Keller, 2006, p. 106)

There are many ways to classify experiments. According to Cardwell (1999), there are three main types of experiments: Laboratory experiment, field experiment and natural experiment. Coolican (2004, p. 109), Gilbert et al. (1998, p. 109-110) and Kerlinger (1986, p. 367) classify experiments to field experiments and laboratory experiments. Gilbert et al. (1998, p. 109-110) also classify laboratory experiment to impact and judgment type. In table 3 it is introduced different classification of experiments by four authors. These different experiment types are introduced next.

Table 3. Different classification of experiments.

<table>
<thead>
<tr>
<th>Author</th>
<th>Laboratory experiment</th>
<th>Field experiment</th>
<th>Natural experiment</th>
<th>Impact (Laboratory experiment)</th>
<th>Judgment (Laboratory experiment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardwell</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coolican</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gilbert et al.</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Kerlinger</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
According to Gilbert et al. (1998, p. 109-110), the researcher should define if the experiment is impact or judgement type. In impact experiment, the participant is deeply involved in the experiment. They are active and the event happens to the participant. In the judgement experiment, the participant is more a passive observer. The event doesn’t happen to the participants and they just witness the event. The researcher should choose one of these types because the event can only be tested with one type of experiment. Some hypotheses are judgemental in nature. The researchers should tailor their method to their hypothesis.

2.3.1 Laboratory experiment

A laboratory experiment is a research study in which the variance of all or nearly all of the possible influential independent variables not pertinent to the immediate problem of the research is kept at a minimum. This is done by isolating the research in a physical situation apart from the real world and by manipulating one or more independent variables under specified, operationalized and controlled conditions. (Kerlinger, 1986, p. 367) In this type of experiment, the researcher has an ability to control and alter the variables being tested. Because of the ability to control, the researcher can also eliminate many of the extraneous variables that might otherwise affect the results of the experiment. (Cardwell, 1999, p. 92)

Benefits of the laboratory experiment are that cause-and-effect relationships can be established. In addition, the laboratory offers the researcher the chance to measure behaviour with a greater precision than would be possible in the natural environment. The laboratory also offers the researcher opportunity to simplify the complex events of the natural world by breaking them down into simpler component parts. (Cardwell, 1999, p. 92)

Kerlinger (1986) listed situation control and the precision of measurements to the strengths of laboratory experiments. Precision means accurate, definite and unambiguous. The laboratory can eliminate the many extraneous influences that may affect the independent and dependent variables. In addition, in laboratory the researcher can use random assignment and can manipulate one or more independent variables. The researcher can also achieve a high degree of specificity in the operational definitions of the variables. The precise of the measurement
decreases error variances in the experiment. (Kerlinger, 1986, p. 367) Weaknesses are introduced in chapter 2.6.

Laboratory experiments have three main purposes. The first one is that they are a means of studying relations under controlled and uncontaminated conditions. The second one is that the testing of predictions is derived primarily from theory and secondarily from other research. The third one is to help build theoretical systems. The most of laboratory experiments are theory-oriented. (Kerlinger, 1986, p. 369) According to Coolican (2004, p. 106), the artificiality of scientific experiments is deliberate. It is a direct consequence of the attempt to eliminate explanations by separating out the correlating and confounding variables that normally determine events in the real world. The researcher should not want to generalise results of laboratory studies directly to real world at all nor even demonstrated effects. The laboratory experiments are for test out specific hypotheses that follow from the theory under research.

2.3.2 Field experiment

Field experiment is more natural type of experiment compared to laboratory experiment. Participants are not aware that they are taking part in experiment. The researcher creates the situation of interest and then records people’s reactions to it. A benefit of field experiment is that it increases the external validity of findings. In addition, the participants will behave more naturally because they don’t know that researcher observes them. The researcher also control independent variable in this type of experiment so cause-and-effect relationships are still possible exist. Weaknesses of field experiment are the subtle of reactions of participants and the less control of extraneous variables. In addition, ethical questions raises because participants don’t be aware of their participation in an experiment. (Cardwell, 1999, p. 93) According to Kerlinger (1986) a field experiment is a research study in a realistic situation in which the researcher manipulates one or more independent variables under as carefully controlled conditions as the situation will permit. (Kerlinger, 1986, p. 369)

Benefit of field experiment is that the control is rarely as tight as that of the laboratory. There can be still uncontrolled environmental variables in the field experiment because it takes place in a natural, often loose, situation. The other benefit is that variables are stronger in realistic
situation than in a laboratory. The realism in the situation increases also external validity. Field experiments are well-suited both to testing theory and to obtaining answers to practical questions. Flexibility and applicability to a wide variety of problems are important characteristics of field experiments. (Kerlinger, 1986, p. 370-371)

Coolican (2004, p. 109) has compared field experiments to laboratory experiments. In table 4 it is introduced differences and similarities of these two experiments types.

Table 4. A comparison of field and laboratory experiments (Coolican, 2004, p. 109)

<table>
<thead>
<tr>
<th>Field experiment</th>
<th>Factor</th>
<th>Laboratory experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>Environment</td>
<td>Artificial</td>
</tr>
<tr>
<td>Controlled (partially)</td>
<td>Independent variable</td>
<td>Controlled</td>
</tr>
<tr>
<td>Random</td>
<td>Allocation of participants to conditions</td>
<td>Random</td>
</tr>
<tr>
<td>Participants may be unaware of study</td>
<td>Awareness of aims by participants</td>
<td>Participants must be aware of being in experiment (not about design)</td>
</tr>
<tr>
<td>Weaker</td>
<td>Control of extraneous variables</td>
<td>Tighter</td>
</tr>
<tr>
<td>Higher</td>
<td>Mundane realism</td>
<td>Lower</td>
</tr>
<tr>
<td>Harder</td>
<td>Replication</td>
<td>Easier</td>
</tr>
<tr>
<td>Usually harder</td>
<td>Expense and time</td>
<td>Usually low</td>
</tr>
<tr>
<td>To real-life field setting is good but to other real-life settings probably weaker</td>
<td>Generalisation (ecological validity)</td>
<td>To real life is often very weak</td>
</tr>
<tr>
<td>Perhaps can’t be brought to field situation</td>
<td>Equipment</td>
<td>Can be complex and only usable in the laboratory</td>
</tr>
</tbody>
</table>

In addition, Coolican (2004, p. 109) listed other disadvantages of field experiments. In field experiments, there are possibly more confounding variables because of greater number of uncontrolled variables. The researcher has to negotiate with field setting personnel. It is important to notice that conditions may not end up ideal.
2.3.3 Natural experiment

Natural experiment is not “true” experiment because the researcher doesn’t have direct control to independent variable. In addition, it is not possible to exert control over the allocation of participants to the various conditions of the experiment. Some outside agent manipulates the independent variable typically in this type of experiment and the researcher is then able to research the resulting change. (Cardwell, 1999, p. 93) In good natural experiment, there is a transparent exogenous source of variation in the explanatory variables that determine the treatment assignment (Meyer, 1995). Benefit of this experiment type is high natural real-life context of the studies. In addition, there are fewer ethical problems. Weakness of natural experiment is that the researcher has little control over the variables under the study. In addition, natural experiments are extremely difficult to replicate. (Cardwell, 1999, p. 93)

2.4 True-experiment design

The design of experiments is a primary part of marketing research. According to Kuhfeld et al. (1994), an experimental design is a plan for processing through an experiment. According to Cardwell (1999), experimental designs are a procedure used to control the influence of participant variables in an experiment. According to Kerlinger (1986, p. 280), research design has two basic purposes: to provide answers to research questions and to control variance. The true-experiment gives to the researcher the opportunity to eliminate alternative explanations by controlling the action of possible confounding variables (Coolican, 2004, p. 58). True-experiments require at least two conditions in order to that variable manipulation can occur. Nevertheless, there is no limit to the maximum number of conditions in principle. (Breakwell et al., 2006, p. 70)

Design means every arrangement that regulates the test so that the results don’t have any misleading elements. These arrangements try to standardize every action in the test. In good design there are five elements. The first one is that design based on a theory. The second one is that setups can be seen in design. The third one is that the design can be used in practice.
The fourth one is that design is flexible. The fifth one is that the design is effective. The design can be brilliant but very hard to understand. On the other hand, the true-experimental designs are often heavier and more expensive than simple transverse studies. (Metsämuuronen, 2005, p. 10)

Cardwell (1999) listed three major types of experimental design. One is the repeated measures design, which means that all participants take part in all conditions. Other one is matched subjects design, which means that an attempt is made to relate the participants in some way. They are matched in terms of whatever the researcher notices an effect on their performance and mask the effect of the independent variable. The third type is the independent subjects design, which means that participants are randomly allocated to different conditions. The researcher does that so that if participant variables do have an effect on performance on the task, they do not do so in any systematic manner. (Cardwell, 1999, p. 93-94) In this work, the focus is on true-experiment designs.

Here is the classical true-experiment design (figure 3):

<table>
<thead>
<tr>
<th>Time of first measurement of causality Y</th>
<th>Time of second measurement of causality Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test group K Result Yk1 Effect of reason X between time 1 &amp; 2 Result Yk2</td>
<td></td>
</tr>
<tr>
<td>Control group V Result Yv1 X does not effect Result Yv2</td>
<td></td>
</tr>
</tbody>
</table>

Result: (Yk2-Yv2)-(Yk1-Yk2)

Selection to the groups is randomized or standardized in other way

Figure 3. The classical experimental research design. (Uusitalo, 2001, p. 66)
In true-experiments, there are three different kinds of design types: factor design, randomized block designs and covariance design. In addition, there is also hybrid design, which is combination of these previous designs. For factor design, it is typical that independent variables (causal factors or effects) are sorted to different kind of groups. The researcher is interested in average of the groups in this design type. This suits for researching in which the researcher wants to discover which method or factor is better than the other one. The main factor is the factor, which differs from other results in other groups. This is called one factor main effect. If more than one factor is main factor then it is several factor main effects. Interaction effect is when there is cooperative action between the factors. Factor design is good choice because the researcher is able to find out the effect of the factor or find out if it exists or not. In addition, factor design is effective to handle several small experiments at the same time. Moreover, factor design is effective and maybe the only way to find out crossing interactions between the factors. (Metsämuuronen, 2005, p. 20-24)

2.4.1 Between-subjects and within-subjects designs

There are two fundamental experimental designs, which form the basis of all the more complex designs. In addition, these designs differ according to the way in which they deal with the control of subject variation. These designs are between-subjects design and within-subjects designs. In between-subjects design, none of the participants appear in both groups and the researcher is interested in differences between groups. Within-subject design helps with the problem that randomly allocated participants were different before the experiment took place. (Breakwell et al., 2006, p. 74 & 394)

Between-subjects design is a research design in which each of the different groups of scores is obtained from a separate group of participants. Also known as an independent-measures design. There is also between-subjects experimental design, which uses a separate, independent group of individuals for each treatment condition being compared. Within-subjects design is a research design in which the different groups of scores are all obtained from the same group of participants. Also known as repeated-measures design. (Gravetter & Forzano, 2012, p. 590 & 600)
The effect is ratio of signal and noise. In the decomposition of variance case, this ratio means what is between groups and within groups. The noise is called within groups. Between-groups is the variance that reflects systematic differences between groups of measures. The main idea in decomposition of variance is that the researcher adds a number in a calculation and subtracts the same number in other place. The result will be the same but it is easier to solve the calculation. The offset of an observation from the average can separate to two components: to the offset of own group average and the offset of whole group from average. In this way, an offset of an observation from the average is easier to observe. The analysis of variance based on using these components. These components usually tabulate to the table of variance. (Metsämuuronen, 2005, p. 44-48) Many experiments involve the use of both within-subject and between-subject measures. These mixed designs are increasingly common. (Breakwell et al. 2006, p. 85) The mixed design is a factorial research that combines two different research designs, such as between-subjects and within-subjects, in the same factorial design (Gravetter and Forzano, 2012, p. 594)

The researcher should decide whether to manipulate the independent variable on a between-subject or within-subject basis. In a between-subject design participants are randomly assigned to different levels of the independent variable. In a within-subject design all participants receive all levels of the independent variable. Within-subject designs are often more common because of fewer participants that are required to achieve sufficient statistical power. Benefit of fewer participants is also that each participant serves as his or her own control in an experiment situation. This increases error variance in a between-subject design. (Gilbert et al., 1998, p. 113)

With random assignment individual differences are averaged across condition. The noise produced by personality differences makes it difficult to detect the signal of the effects of the independent variable. In a within-subject design, this problem is solved by running every person in every condition. The researcher should make sure that the effects of the independent variable are not confounded with the order in which participants receive the different manipulations in a within-subject design. Sometimes it makes no sense to use a within-subject design because the participants have to receive the same stimulus more than once under slightly different conditions. (Gilbert et al., 1998, p. 114)
2.4.2 Factorial designs

Factorial design is the structure of research in which two or more independent variables are juxtaposed in order to study their independent and interactive effects on a dependent variable. The combinations of three-, four-, and five-variable designs give a wide variety of possible designs. (Kerlinger, 1986, p. 322) All factorial designs have two or more treatments, each treatment has two or more levels and the levels of different treatments are combined to form treatment combinations. Factorial designs are constructed from three building block designs: the completely randomized design, randomized block design and Latin square design. (Kirk, 2013, p. 357)

Randomized block designs are based on an idea that in the blocks or part of blocks the test persons are more similar than in the whole material. For example, in the customer satisfaction test different kind of customer groups are able to work as blocks. After measuring at the beginning of the test, the researcher is able to sort test persons to three or four different level groups. In these level groups, the researcher can dispense the persons in to block groups that are control group and test group. The variation inside the group is now smaller than between the groups. Making blocks the researcher is able to make smaller variation between the groups but the same effect is still there in the same time. (Metsämäuronen, 2005, p. 24-26)

The benefit of randomized block designs is that it makes the random variation (the noise) smaller. As a result, it is important that the signal (the effect) is bigger than the noise (random variation). (Metsämäuronen, 2005, p. 24-26) This design is used a blocking procedure to reduce error variance. There are three approaches to controlling these undesired sources of variation. Firstly, holding the nuisance variable constant. Secondly, assigning of the experimental units randomly to the treatment levels in a suitable way. This means that known and unsuspected sources of variation among the units are distributed over the entire experiment and thus do not affect just one or a limited number of treatment levels. Thirdly, including the nuisance variable as one of the factors in the experiment. (Kirk, 2013, p. 280)

Completely randomized design is one of the simplest experimental designs from the standpoint of data analysis and assignment of subjects or experimental units to treatment
levels. This design suits for experiments when one treatment is with two or more treatment levels. Moreover, the other requirement is that random assignment of experimental units to the treatment levels, with each experimental unit designated to receive only one level. The number of experimental units in each treatment level need not be equal. This design is applicable to a broad range of experimental situations. (Kirk, 2013, p. 125)

Latin square design ensures that each level or condition appears equally in each position (Breakwell et al., 2006, p. 84). Latin square design extends a procedure to two nuisance variables. One nuisance variable is assigned to the rows of a square and second nuisance variable is assigned to the columns of the square. By isolating two nuisance variables, this design is generally more efficient than completely randomized and randomized block designs. The Latin square got its name from an ancient puzzle that dealt with the number of ways that Latin letters could be arranged in a square matrix. (Kirk, 2013, p. 671-672)

2.4.3 Covariance designs

Covariance design is a random test in which there is measuring at the beginning of the test. This measuring is called covariance. In this design, it is important that the observations are randomized to every test group (R). In addition, the measuring has been done before testing (O) or the researcher must use other relevant continuing background variance, which correlates with the post-measuring powerfully as possible. Moreover, in each group it has been done the same effect or treatment (X). In the end, the researcher will measure the both groups with same indicator in the same way (O). (Metsämuuronen, 2005, p. 27-29)

Figure 4 is an example of this design:

![Figure 4](image-url)

**Figure 4.** An example of Covariance Design. (Atkinson et al., 1996)
2.4.4 Hybrid designs

Hybrid designs are combinations of previous designs. Solomon four-group design and switching replications design are examples of hybrid designs. In the Solomon four-group design, there are two other groups besides control group and test group (R). The researcher won’t do the measuring before testing for these two groups (O). In the two groups the researcher does the effect or treatment (X). In the end, the researcher will measure the both groups with same indicator in the same way (O). (Metsämuuronen, 2005, p. 29)

Figure 5 is an example for this design:

```
R O X O
R O O
R X O
R O
```

**Figure 5.** An example of Solomon Four-Group Design. (Atkinson et al., 1996)

In switching replications design, the researcher does for two randomized group the same effect but the other group will get the treatment first and the other group after a while. This design is the most powerful in situations where the action happens regularly. In this design, the test is replicated twice but the parts of groups turn around in this way (figure 6). In the ideal case, the both groups have almost same results. (Metsämuuronen, 2005, p. 30)
2.4.5 Hierarchical designs

The idea of hierarchical design is that the levels of at least one treatment are nested in those of another treatment and the remaining treatments are completely crossed. For example, if each level of treatment B appears with only one level of treatment A, B is then said to be nested in A. These designs that are constructed from completely randomized designs are appropriate for experiments that meet the three conditions. Firstly, there are two or more treatments, with each treatment having two or more levels. Secondly, the levels of at least one treatment are nested in those of another treatment. So, non-nested treatments are crossed. Thirdly, the combinations of the nested treatment or treatments are randomly assigned to the non-nested treatment. In addition, the experimental units are randomly assigned to the treatment combinations. This method is often used in research situations where the third requirement cannot be met. (Kirk, 2013, p. 489-491)

2.5 Statistical methods

Analysis of experimental designs is almost same thing than using variance analysis. There are two different aspects in variance analysis. The other is based on decomposition of variance and the other is based on general linear modeling (GLM). General linear modeling is based on idea that variance analysis is part of regressive analysis. GLM is the base for t-test, ANOVA, ANCOVA, regressive analysis and for several other variance methods. (Metsämuuronen, 2005, p. 44-49) Ordinary least-squares (OLS) regression is a generalized linear modeling
technique that can be used to model a single response variable, which has been recorded on at least an interval scale. (Hutcheson, 2011)

2.5.1 Analysis of variance

ANOVA (analysis of variance) is a parametric test. It means that the researcher needs to check if the data conforms to the assumption. (Gavin, 2008, p. 127) ANOVA is a way of calculation to use F-test and compare the factor to the noise. The noise is in this case within group variance. F-test is variation between groups divided by variation within groups. (Metsämuuronen, 2005, p. 44-49) So, ANOVA compares the variance between groups with the variance within groups. If variation within groups is low compared with the variation between groups, it is clear that something is responsible for the mean differences and the researcher suspects a real effect. (Coolican, 2004, p. 480)

According to Gavin (2008), the test used in ANOVA compares items related to the variance between the levels of the factor with the variation within groups. Variation within groups means for example measurement errors. The ANOVA accounts for this and compares the two types of variation in a ratio. If the between variation is much larger than the within variation, the means of different conditions will not be equal. If the between and within variations are approximately the same size, then there will be no significant difference between the levels. (Gavin, 2008, p. 127) According to Cardwell (1999), ANOVA is a model, which looks at how the researcher uses covariation information across three dimensions relevant to the behavior and its context. The first dimension is consensus, which tells that do people react in the same way. The second one is consistency, which means that do people normally react like that in the situation. The third one is distinctiveness which answers do they only react like that in this situation or in many situations. Depending on the combination of information the researcher can explain an event by attributing it to the actor, the person or object to which it was directed or situation in which the behavior was observed. (Cardwell, 1999, p. 60-61)

In table 5 there is an example about ANOVA table. The numbers are random and they indicate the ratio of numbers.
### Table 5. An example of ANOVA table. (Metsämuuronen, 2005)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sums of Squares</th>
<th>df (Degree of Freedom)</th>
<th>Mean Squares</th>
<th>F</th>
<th>p (Significance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>90</td>
<td>1</td>
<td>90</td>
<td>360000</td>
<td>0.0003</td>
</tr>
<tr>
<td>Within Groups</td>
<td>20</td>
<td>8</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are three assumptions in variance analysis. The first one is that observations are independent. The second one is that offsets of variances inside the basic group are normally distributed. The third one is that variances of all groups are equal. It must be made sure that these three assumptions are true in the analysis. SPSS program is a good tool for variance analysis. (Metsämuuronen, 2005, p. 54-55)

#### 2.5.2 Multivariate analysis of variance

MANOVA is a set of statistical procedures that tests the significance of multiple dependent variables as a set. With MANOVA it is possible to test several dependent variables as a set across the various conditions of the independent variable. It estimates the significance of any difference across levels of the independent variable taking all assessments together. If the overall MANOVA shows significance then it is legitimate to investigate further and take as significant any of individual ANOVA results, which the MANOVA procedure has shown to be significant to the researcher. (Coolican, 2004, p. 495)

#### 2.5.3 Analysis of covariance

Analysis of covariance (ANCOVA) combines regression analysis with analysis of variance. The aims of this statistical control type are to remove sources of bias from the experiment, obtain adjusted estimates of population means and reduce error variance. The dependent
variable can be adjusted to remove the effects of the uncontrolled source of variation represented by the concomitant variable. So, the idea of this method is to measure one or more concomitant variables in addition to the dependent variable. The concomitant variable shows a source of variation that has not been controlled in the experiment and one that is believed to affect the dependent variable. Benefits can be a reduction in error variance or increase its power and reduction in bias caused by differences among experimental units where those differences are not attributable to the manipulation of the independent variable. (Kirk, 2013, p. 621)

2.5.4 Regression analysis

The simple regressive analysis model is that the researcher measures dependent variable and independent variable and finds out the regression of the two variables. Dummy factor is so that the researcher is able to generalize simple regressive model to variance analysis. Dummy factor is a variable, which can get value 0 or 1. In general, dummy factor (Z) means involving to the group (1) or not involving the group (0). It is important to know if the observation includes the test group (1) or control group (0). Dummy factor is so called switch which the researcher uses to test the effects in the test group. (Metsämuuronen, 2005, p. 50-52)

2.5.5 T-test

According to Gavin (2008, p. 109), single factor designs based on the effect of one factor on the dependent variable. T-test is one type of single factor designs. A factor is something which may be thought to have an effect and which has more than two levels. By investigating this effect in experimental research the researcher designs an independent variable from the factor and manipulates three or more conditions.

The right test type is t-test if there are enough observations in each group, the measurement has been at least in distance level and correlative variance is enough normally distributed. In addition, conclusion from statistical significant difference between two groups is based on t-distribution. (Metsämuuronen, 2005, p. 54-55) The t-value will be positive if the first mean is larger than the second and negative if it is smaller (Gavin, 2008, p. 109).
2.5.6 Chi-square test and phi-test

The chi-square test is used to determine whether there is a significant difference between the expected frequencies and researched frequencies in one or more categories. It answers to question that differs the number of individuals or objectives that fall in each category significantly from the number the researcher would expect. In addition, is this difference between the expected and observed due to sampling error or is it a real difference. (Maben, 2004)

There are seven requirements for chi-square test. The first one is that data must be quantitative. The second is that there should be one or more categories in the research. The third one is that observations must be independent. The fourth one is that total N should be at least 10. The fifth one is that random sample should be simple. The sixth requirement is that data is in frequency form. The last requirement is that all observations must be used. The researcher finds the expected frequencies for chi-square in two ways. The first one is that the researcher hypothesizes that all the frequencies are equal in each category. The other way is to determine the expected frequencies on the basis of some prior knowledge. (Maben, 2004)

Phi-test is a special short cut formula and it is also called the point-biserial correlation. It is used for the correlation between a binary and continuous variable. T-tests, chi-squares and Phi-tests are almost equivalent statistical methods. (Newsom, 2013)

2.6 Limitations of experimental research

It is impossible to accomplish an experiment that is high in both internal and external validity. If the researcher controls the experiment to the point of being sterile, the experiment may fail to involve participants, have little impact on them and therefore may not affect their behavior to any great extent. Then the results will be hard to generalize to other settings. (Gilbert et al., 1998, p. 133) Limitation of experimental research is its artificiality. This means that the effects occurring in an experiment under research controls might not take place in more natural settings. Sometimes it is difficult to know if artificiality is a weakness or simply a neutral characteristic of laboratory experimental situation. Laboratory experiments have
relatively high internal validity but they lack external validity. (Kerlinger, 1986, p. 368)

Experimental results never “confirm” or “prove” a theory. They just “probe” a theory. (Campbell & Stanley, 1963, p. 34)

Coolican (2004, p. 62) listed four limitations of experiments. The first one is reactivity effect if participants know they are in an experiment. There is also possibility to ethical problems if not. The second one is limits the kind of phenomena that can be investigated because variables must be tight in operational definition and conditions can therefore be quite artificial. The third one is that participant’s contribution completely prescribed. This means that there won’t be maybe any unique view from participants. The fourth one is that the researcher can invest results with false scientific credibility.

Coolican (2004, p. 109) named low construct validity as disadvantage of laboratory experiment. Narrow dependent variable and independent variable can lead to low construct validity. In addition, setting is more likely to create apprehension in subjects, for example wariness of strange surroundings etc. and this is other weakness of laboratory experiments.

According to Kerlinger (1986) the greatest weakness of the laboratory is probably the lack of strength of independent variable. Sometimes the researcher cannot do an experiment because it is impossible to manipulate independent variable, either for practical or ethical reasons. Laboratory situations are created for special purposes and it can be said that the effects of experimental manipulations are usually weak. In laboratory research only small effects are usually produced by group pressure on individuals. (Kerlinger, 1986, p. 367-368)

According to Cardwell (1999), weakness of the laboratory experiment is that it lacks relevance to real life. The participants may react to the laboratory setting in way they think the researcher wants and the experiment requires. In addition, ethics questions raises because avoiding demand characteristics and evaluation apprehension often involves in laboratory research. (Cardwell, 1999, p. 92)

Weaknesses of field experiment are manipulation of independent variables and randomization. Even if random assignment is possible and permitted, the independent variable may be seriously blurred, because the effects of the treatments cannot be isolated
from other effects. The attitude of the researcher plays an important role how successfully the field experiment has been done. The lack of precision is one other weakness in field experimental situations because extraneous independent variables abound. (Kerlinger, 1986, p. 371-372) According to Breakwell et al. (2006, p. 86) experiments lack ecological validity. The researcher must tightly control participants in laboratory conditions and the experiment doesn’t tell anything about life outside the laboratory. Then, the experiments lack also external validity. Nevertheless, weaknesses and limitations of experimental research must be offset by strengths or advantages in other features (Gilbert et al., 1998, p. 134).

According to Gribbons and Herman (1997), one limitation is also logistical and feasibility issues that constrain experimental frameworks. This often leads the researcher to use quasi-experimental designs. Next will discuss about the risk of validity. The risk of validity is an important part of experimental research and its limitations.

2.7 Risks of validity

The validity refers to the confidence the researcher may have that a test, measurement or experimental manipulation is actually working the way it has been designed to work. (Cardwell, 1999, p. 241) The most important notification in the experimental research design is to avoid potential internal errors, which affect the result. These errors cause variations to the result. The function of the research design and analysis methods is to control the variation. (Metsämuuronen, 2005, p. 12) In other words, internal validity is a primary consideration and it is the ability to say that the manipulation of variables has led to an observed difference. However, the researcher needs to be sure whether the observed changes can be attributed to the manipulations of differences in the levels of the independent variable and not to other possible causes. (Gavin, 2008, p. 47) Internal validity (A causes B) is trivial without reference to constructs and causation in single instances is impossible. (Shadish et al., 2002, p. 462)

The important issue is to eliminate these error variables from the research. These errors are hazards for the reliability of the study. These hazards of the validity can be sorted to three categories. First one is the time hazard. Second one is measurement hazard. The third one is selection of the test group members. (Metsämuuronen, 2005, p. 12)
Time hazards are effects of history, maturation and statistical regression. The history effect arises for example when test persons have different education or status in a work place. The solution for this hazard is setting a control group which has similar history than test group. The maturation hazard means that for example the members of test group educate themselves within the test process and know more about the dependent variable. Without the control group this phenomenon would be very hard to control. The statistical regression hazard means that ultimate observations approach to the average without test effect. It is important to select to the control group people who are for example from the same department as the persons in the test group. (Metsämuuronen, 2005, p. 13)

The risks of measurement hazard are changing of the measure, effect of testing, expectations and action of the researcher, halo effect and hawthorne effect. The changing of the measure means that for example the researcher is stricter at the beginning of the test and changes attitude to more friendly during the test. Then, the test group changes attitudes towards to researcher and behaves differently during testing. It is important that the researcher verifies the test design after starting testing. The effect of testing happens when the test person changes its normal behavior because of being a part of test. The social pressure is one factor that changes the behavior. The control group might be a solution for this challenge. (Metsämuuronen, 2005, p. 14)

According to Cardwell (1999), the halo effect refers to somebody’s tendency to allow one specific trait or overall impression of a person to influence the judgment of other traits of a person. (Cardwell, 1999, p. 111) Metsämuuronen (2005) tells that halo effect means that the researcher changes the attitude towards the test persons because these people belong to the test. For example, the researcher knows that one of the test persons is a very valued leader in the famous company and the researcher starts to serve this person better than other and explain more about the test to this person. Randomizing and more objective methods are ways to eliminate this challenge. In addition, the researcher should to realize this and try to avoid this hazard. (Metsämuuronen, 2005, p. 14)

Hawthorne effect happens when test persons react to everything positively and social correcting. The name of this effect became from the test which has been done in Hawthorne, In USA. In this case, the researcher tried to find out causality between lightning inside the
factory and working effectiveness. First the researcher increased the lightning and the effectiveness increased. Then the researcher decreased the lightning and effectiveness still increased. The true reason to the increasing of the effectiveness was that the workers felt that somebody cared about them. (Metsämuuronen, 2005, p. 14; Uusitalo, 2001, p. 64-65; Cardwell, 1999, p. 112-113) Nowadays this effect is often quoted whenever there is the possibility that the behavior of participants is changed because they know they are being observed by the researcher. (Cardwell, 1999, p. 113)

For example, supplier tries to get more customers and contacts with the manufacturers. The aim is to introduce their services with three different customer references. The researcher will get positive signals from manufacturers in spite of which one of the three customer references the researcher introduced. The true reason might be that these manufacturers are happy about the contact and this supplier is the only one who could supply their services or products in that business area. The control group and blinding are ways to eliminate this hazard. Blinding means that the researcher or test persons do not know something about the testing, for example which customer reference has been showed to the last test person.

The hazard of selection of the test group members is important to randomizing because without it the result of the test will not be true. If the researcher doesn’t know whether the test group and control group members are similar or not, there could be some unknown factors affecting the results. If some of the group members cancel their participation of the test then the researcher should make sure that the rest of the group has enough validity for the test situation. (Metsämuuronen, 2005, p. 15) Table 6 is a table about the common research hazards in experimental research. In addition, there is a table of solutions to these hazards.
Table 6. The risks of the internal validity and ways to control them. (Metsämuuronen, 2005)

<table>
<thead>
<tr>
<th>The ways of controlling hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risks of validity</td>
</tr>
<tr>
<td>History</td>
</tr>
<tr>
<td>Maturation</td>
</tr>
<tr>
<td>Statistical regression</td>
</tr>
<tr>
<td>Measurement</td>
</tr>
<tr>
<td>Testing</td>
</tr>
<tr>
<td>Halo</td>
</tr>
<tr>
<td>Hawthorne</td>
</tr>
<tr>
<td>Selection</td>
</tr>
<tr>
<td>Canceling of test person</td>
</tr>
</tbody>
</table>

2.7.1 External validity and internal validity

According to Cardwell (1999), external validity is the ability to generalize from results obtained in laboratory research to other settings and other participants. Generalization may not always be demonstrated because environment of the laboratory sets up artificial behavior in participants. According to Gavin (2008), external validity means that the experimental results can be generalized to a real-world situation. The sample needs to be generalized to the whole population. One way of improving external validity is to improve the sampling procedure that had been used. The researcher can demonstrate the external validity with carrying out the study in a variety of places, with different people and different times. (Gavin, 2008, p. 48-49) External validity tells the level of generalization to the real world. Internal validity refers to how well an experiment is done. (Campbell & Stanley, 1963, p. 5) Internal validity answers the question was the observed effect really a product of the experimental manipulation. (Cardwell, 1999, p. 241)

There are ways to threat external validity. Interaction of testing and treatment can be decreased with a pretest, which may diminish subject’s sensitivity to a topic and thereby reduce the effectiveness of a treatment. In interaction of selection and treatment it is important that the results are always generalized only to the volunteer population. It is also important that the results may not generalize to the unique characteristics (interaction of setting and treatment). The researcher should also collect the results on same day from the test
(interaction of history and treatment). In addition, the researcher should make sure that the test persons doesn’t be too aware that they are observed because of different behavior (reactive arrangements). When subjects are exposed to more than one treatment, the results may generalize to only populations that have been exposed to the same combination of treatment (multiple-treatment interference). (Kirk, 2013, p. 19)

2.7.2 Construct validity

Construct validity is the type of validity demonstrated when scores obtained from a measurement behave exactly the same as the variable itself. It is based on many research studies and grows gradually as each new study contributes more evidence. (Gravetter and Forzano, 2012, p. 591) Usually, an effect really does occur when the independent variable is manipulated. Nevertheless, the reasons aren’t the same what the researcher thinks. In this situation, the researcher makes an assumption about the wrong psychological construct. Construct validity refers to the extent to which the psychological constructs being proposed or researched are valid ones. (Coolican, 2004, p. 85) Construct validity refers to the correct identification of the nature of the independent and dependent variables. In addition, it underlines relationship between these variables. (Gilbert et al. 1998, p. 130) According to Cardwell (1999, p. 241) construct validity answers to the question whether the test accurately measures some underlying construct for example does an intelligence test actually measure intelligence. The use of manipulation and confounding checks are only ones of several methods for assessing the construct validity of the experimental manipulations (Perdue and Summers, 1986)

2.8 Experimental versus quasi-experimental research

There are three different kinds of experimental designs. The strictest experimental design is so called true-experiment. In that experiment, the observations are randomized to two or more groups and the purpose is that the groups are so similar as it is possible to be. Other experimental designs are so called quasi-experiment and pre-experimental experiment. In the quasi-experiment, the groups are so called non-equivalent. It means that the groups differ from each other at least a little. In the pre-experimental experiments, there are not usually
control group or there is control group without measuring before the test. (Metsämuuronen, 2005, p. 20) In this part has been compared experimental and quasi-experimental research.

An experiment enables a researcher to discover a hypothesized relationship between an independent variable and a dependent variable by manipulating the independent variable. Experiments are usually used in an environment that permits a high degree of control of confounding variables. Experimental research includes four essentials criterions so that the study is experimentally accomplished. Firstly, a hypothesis is for a causal relationship. Secondly, there are both a control group and a treatment group. Thirdly, the researcher tries to eliminate confounding variables that might disturb the experiment and prevent displaying relationship. Fourthly, the experiment includes large randomly sorted groups in order to keep accidental differences away from the measurement. Manipulation of an independent variable and use of controls such as randomization distinguish experiments from non-experimental research strategies. (Kirk, 2013, p. 6)

Quasi-experimental research strategy is a research strategy that attempts to limit threats to internal validity and produce cause-and-effect conclusions. Nevertheless, it lacks manipulation or control. (Gravetter and Forzano, 2012, p. 597) Usually the researcher has research questions that cannot be answered by resorting to true-experiments. Sometimes quasi-experiments are the next useful logical step in a long research process where laboratory-based experimental findings need to be tested in practical situations to see if the findings are really useful for real-life. (Breakwell, 2006, p. 92) Quasi-experiment is a type of experiment in which the researcher doesn’t directly affect the allocation of participants to the conditions under research. Nevertheless, it makes use of divisions that already exist in terms of the conditions of interest of researcher. The researcher should remember that the conclusions from the quasi-experiment must be viewed more carefully because of the decreased control over other possible influences. (Cardwell, 1999, p. 190) In quasi-experiments, the cause is manipulable and occurs before the effect is measured. (Shadish et al., 2002, p. 14)

Quasi-experiment is an experiment in which units are not assigned to conditions randomly. In a quasi-experimental research, the researcher treats a given situation as an experiment even though it won’t fill all the criterions of the experimental research. Sometimes the researcher cannot control all the factors that might affect the outcome. The researcher may not
manipulate the independent variable or treatment and control groups may not be randomized or matched. Sometimes there may be no control group. Quasi-experimental control groups may differ from the treatment condition in many non-random ways other than the presence of the treatment. In quasi-experiments, the cause is manipulable and occurs before the effect is measured. The researcher has to enumerate alternative explanations one by one. (Shadish et al. 2002, p. 14) Quasi-experiments are used usually instead of experiments when random assignment is not possible or when it is necessary to use pre-existing or naturally occurring groups for practical or ethical reasons. The interpretation of the results of most quasi-experiments is often less straightforward because it is hard to rule out all variables other than the independent variable as explanations for an observed difference. (Kirk, 2013, p. 7)

The aim of the quasi-experiment is to evaluate interventions but that don’t use randomization. In addition, the aim is to demonstrate causality between an intervention and an outcome. The reasons to not to randomize the intervention are ethical considerations, difficulty of randomizing subjects, difficulty to randomize by locations and small available total N. (Shadish et al. 2002, p. 14)

The significant similarity of both experiments and quasi-experiments is the measure of the dependent variable. Quasi-experiments often involve a number of strategies to compare subjectivity better than experimental research. (Shadish et al. 2002, p. 14) In testing, both type of experiments use ANOVA and ANCOVA tests to measure differences between control and experimental groups, as well as different correlations between groups. Experiments usually have good internal validity comparing to quasi-experiments that have somewhat less interval validity (Kenny, 1975).

In figure 7, it is summarized what are the differences and similarities of these experiments. It can be seen that in quasi-experiment randomization of groups and manipulation of independent variable aren’t necessary.
Figure 7. Design and variables in a true-experiment and quasi-experiment. (Coolican, 2004, p. 103)
3 EXPERIMENTAL RESEARCH IN JOURNAL SELECTION

In this study, the usage of experimental research has been analyzed in business-to-business context. There were four valued academic marketing journals and they were chosen with help of external authority. These academic marketing journals were Journal of Marketing, Journal of Marketing Research, Journal of the Academy of Marketing Science and Industrial Marketing Management.

These four journals have been chosen because of their impact factors and relevance for this work. In addition, these journals publish articles about industrial marketing and research. Journals have been chosen with different kind of impact factors in this work. The impact factor is useful in clarifying the significance of absolute / total citation frequencies (Thomson Reuters, 2013). The impact factor of Journal of Marketing was the highest of these four selected journals. Journal of Marketing was very relevant for discovering experimental research in industrial marketing context because the issues of articles included different kind of aspects of researching marketing. In addition, Journal of Marketing was well known and valued marketing journal. The impact factor of Journal of Marketing Research was 2.5 (Thomson Reuters, 2013). The benefits for choosing Journal of Marketing Research were that there were articles of a wide range of marketing research concepts, methods and applications. In addition, Journal of Marketing Research had articles written about contributions to knowledge based on experimental methods. (Researchgate.net, 2014)

Industrial Marketing Management had the lowest impact factor. This journal was chosen because it was well-known and valued industrial marketing journal. In addition, the editors of the journal are leading international academics and professional who offer theoretical and practical approaches to the growing area of industrial marketing. The impact factor of Journal of Academy of Marketing Science was 2.7 (Thomson Reuters, 2013). Journal of the Academy of Marketing Science was selected because of researching marketing globally. In addition, the journal increased the conduct of research and disseminated the research results through the study. (Researchgate.net, 2014) At the beginning of the data collecting, it could assumed that in these four journals there will be articles about experimental research in industrial marketing context because all journals were concentrated to marketing and had articles about research. In table 7, it is introduced impact factors and relevance of selected journals.
Table 7. Impact factors and relevance of selected journals.

<table>
<thead>
<tr>
<th>Journal</th>
<th>Impact factor (Thomson Reuters, 2013)</th>
<th>Relevance (ResearchGate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal of Marketing</td>
<td>5.5</td>
<td>Well-known and valued marketing journal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In-depth articles and gaps between theory and application</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Issues of the journal include original research on all aspects of marketing</td>
</tr>
<tr>
<td>Journal of Marketing Research</td>
<td>2.5</td>
<td>Discovers the latest thinking in marketing research, from theories to methods and techniques</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Covers a wide range of marketing research concepts, methods and applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Written about new techniques, contributions to knowledge based on experimental methods and developments in related fields that have an aim on marketing research</td>
</tr>
<tr>
<td>Industrial Marketing Management</td>
<td>1.5</td>
<td>Well-known and valued industrial marketing journal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The editors are leading international academics and professionals who offer theoretical and practical approaches to the growing area of industrial marketing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The journal has the most timely data because of the editors</td>
</tr>
<tr>
<td>Journal of the Academy of marketing Science</td>
<td>2.7</td>
<td>Furthers the science of marketing globally</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promotes the conduct of research and disseminates the research results through the study</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improves marketing as an economic, ethical and social force</td>
</tr>
</tbody>
</table>
In the beginning of this work process, the aim was to discover only the two academic marketing journals, which were Journal of Marketing and Journal of Marketing Research. They are concentrated on marketing subjects and are academic marketing journals. The challenge was to find out enough articles about industrial marketing and its experimental research. There was lack of articles in which the researcher has used experimental research to study industrial marketing. It was a challenge to find suitable articles because it seemed to be quite unusual researching area to discover using the experimental research. The sampling of suitable articles was wider after getting two more academic marketing journals, Journal of the Academy of Marketing Science and Industrial Marketing Management, in this work. Next there is a little discussion about the reasons why industrial marketing has been less researched with experimental research than consumer marketing.

3.1 Researching industrial business versus consumer business

The researchers have more challenges when they research industrial business than consumer behavior. One challenge is data collecting. The challenge of data collecting is that there are many people involved in organizational processes in industrial business. In consumer business, one consumer makes his or her own decisions and behaves independently. For that reason, it takes more time to find right people to the research in industrial marketing than in consumer marketing. Data collecting is more difficult because the potential experiment participants have less time to spend for a research than consumers. It could be harder to organize laboratory experiment with business participants than consumer participants because of time. The researcher should convince the potential business participants that the study is useful and valued for the company and to the participant itself. For that reason, it will be harder for the researcher to get enough participants to a research process. In addition, the firm wants in some business cases to keep their organizational processes in secret. The business participants will give less essential information about research subject in a research situation than a consumer because of professional secrecy.
Other challenge is unit of analysis. In industrial business the unit is usually organization and in consumer business the unit is a person. Let’s think about buying behavior in industrial business and consumer business. The decision of every purchase, choose of supplier etc. goes through a process inside the firm in industrial business. Inside a process, there can be dozens of people in industrial business. The decision-making unit is far more complex in industrial business than consumer business because in consumer business every participant can make own decision. The business participant can’t answer only what he or she thinks about the research subject because it depends also on the decision process inside the firm. In addition, the business buyer has a budget, which the firm sets.

It is also a difference between consumer and industrial business research that business participant has less possibilities to choose from whole selection than consumers. The consumers can choose any of products in the market and buy it but business buyers can only choose products from several suppliers that fill the needs and standards of the firm. In business-to-business context, companies seek long-term relationships and a different brand will have impacts on the entire business. Brand loyalty may be therefore much higher than in consumer business. Business-to-business products and their applications are more complex than consumer products. In some business cases, the firm must notice what law allows they to do. The buying process in industrial business is complex and takes more time. In consumer business, the consumer makes own decision if she or he buys something or not. The consumer can spend all the money, which this person wants to spend to the product or service. In business-to-business markets, the buyer has a budget and other limitations in buying process. The relationships in industrial business are tighter than in consumer business. It may be harder to get information of the relationships in industrial business because of business trust. Moreover, there are a much smaller number of customers who are very much larger in their consumption of products than in consumer business.

The other challenge is also that there are more possible extra factors that influence to the business process than in consumer behavior because of complex buying process. Then, it could be harder for a researcher to control extraneous variables in industrial business research than consumer research. The researcher should become familiar with the industry of the firms of the research and take a look inside the processes of selected firms. So, it needs more time to collect background information in industrial business research than in consumer business.
research so that the research process will be relevant. For these all reasons, it is probably more common to research consumer business than industrial business with experimental research.

3.2 Process of data collecting

The articles have collected from four academic marketing journals from years 1992-2012. First, Journal of Marketing and Journal of Marketing Research articles have reviewed one by one from the past two decades. The common keywords in these suitable articles were “experimental research”, “laboratory experiment”, “field experiment”, “stimuli” and “business-to-business”. These articles with keywords “consumer” and “meta-analyze” have been left out from this study. Only articles about experimental research in the business-to-business context have been taken in this study. The other criterion was that the studies have used experimental research in overall study, not only in part of study.

In table 8 has showed amount of published and discovered articles of JM, JMR, IMM and JAMS. In addition, there is introduced amount of experimental research and amounts of articles per each article category. In the figure 8 have introduced the whole process from journal selection to conclusions. The most used keyword was “experimental research”. “Laboratory experiment” and “field experiment” keywords were used also but they did not help to find many new articles.

Table 8. Findings after data retrieval.

<table>
<thead>
<tr>
<th>Journal</th>
<th>Published in years 1992-2012</th>
<th>Discovered articles of research</th>
<th>Experimental research in B2B context</th>
<th>Amount of articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal of Marketing</td>
<td>1060</td>
<td>348</td>
<td>5</td>
<td>5091</td>
</tr>
<tr>
<td>Journal of Marketing Research</td>
<td>1287</td>
<td>581</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Industrial Marketing Management</td>
<td>1750</td>
<td>250</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Journal of the Academy of Marketing Science</td>
<td>994</td>
<td>13</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Amount of articles</td>
<td>5091</td>
<td>1192</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>
Figure 8. Data retrieval process and analyses of articles.
4 ANALYSES OF ARTICLES

This part answers to second research question “What kinds of industrial articles about using experimental research have been published in the selected journals in years 1992-2012?”. There is introduction of what kind of industrial marketing subjects has been discovered with experimental research and what kind of experimental research design (total N, designs, statistical methods etc.) has been used in the selected articles. The data was collected from four selected journals: Journal of Marketing, Journal of Marketing Research, Industrial Marketing Management and Journal of Academy of Marketing Science. First these four journals were analyzed separately and in the end there is the comparison of findings of these four journals.

4.1 Journal of Marketing (JM)

In the introductions part the summary of each selected articles of JM is introduced. The order of the introduced articles is in the table 10. After introductions there is discussion about total N, research process, designs, statistical methods and results.

4.1.1 Introductions of the selected articles

In the first article, Johnston & Kim (1994) discovered how salesperson’s attributions affect to expectancy estimation of the salesperson. They had three experimental studies and one field study in their research. They had two laboratory experiments and one field experiment. The participants of studies 1 and 2 were business students and salespeople in the study 3. They had three factor pairs: success / failure, internal / external and stable / unstable in their experimental studies. In study 1, after reading a sales scenario, participants were asked to answer to questions on their initial expectancy about the specific selling task. Each condition of the study 1 consisted of a current performance (success or failure) and one of the four causal attributions.

Participants were given a distracter task between each condition. They were asked to sign up for team projects to read and discuss about an assignment that was not related to the study topic. In the end each participant’s after-attribute expectancy was calculated by comparing
it with the initial expectancy. The aim of the first study was to test their conceptual framework in a general setting. The main results were that causal attributions had an impact on expectancy and it depended on certain underlying conditions. In addition, salespeople’s prior experience might moderate the effect of attribution on expectancy change.

In the second article, DeCarlo & Leigh (1996) researched with a field experiment the effects of sales managers’ behavior to sales personnel attraction. Each sales manager got a survey packet by email. In addition, they were asked to complete blank spaces with a sales person name and read scenarios. Their experiment required the development of independent treatments for two levels of task attraction, two levels of social attraction and three levels of information ambiguity. Manipulation checks were taken and practicing sales managers were randomly assigned to a single experimental cell and mailed a packet. Researchers pretested first with 14 sales managers and then with 40 fulltime MBA students. These pretested, revised scenarios were then reviewed in telephone interviews with 2 sales managers. The main findings were that causal attributions, cognitive effort and decision confidence were directly impacted by task and social attraction. The effects of task and social attraction on coercive feedback were mediated by internal attributions. The third important finding was that external attributions play a partial but negative mediating role for non-punitive feedback.

In the third article, Kumar et al. (2008) tested experimentally how customer-focused sales campaign affects to a firm’s relational and financial performance. They had two field experiments. The meaning of the second experiment was to generalize the findings to B2B and B2C. They contacted the test-group customers using a customer-focused sales campaign and the control-group customers were contacted using a product-focused sales campaign. The main result was that the success of a customer-focused sales campaign depends on how well the firm translates the understanding of the customer needs into coordinated sales calls. These studies showed that impressive financial returns can be obtained from adopting a customer-focused sales campaign.

In the fourth article, Palmatier et al. (2009) conducted two experimental studies about customer gratitude. The first study was laboratory experiment and the second one was field survey. The first study made in B2C context with 155 business undergraduate students. Their experimental design was between-subjects design. The second study was not experimental
research. Nevertheless, the meaning of the second study was to generalize results from B2C context to B2B context. The second study was divided to 2a and 2b parts. The main result was that gratitude is an important element for understanding how relationship marketing (RM) investments increase purchase intentions, sales growth and share of wallet.

In the fifth article, Ozimec et al. (2010) experimentally discovered with online experiment how symbolization affects to decision performance in marketing situations. The between-subjects design variation was seven map groups either with time pressure or without time pressure. The sample consisted of 34.9 percent of GIS (geographical information systems) experts, 19.4 percent of people who employed in the area of site location planning, 45.5 percent of students and 8.6 percent of “other”. After a little brief of using GIS thematic maps, the respondents asked to choose the most attractive of five potential store locations for a new furniture retailer in a market with using information provided of GIS thematic maps. The main result was that type of symbolization effected strongly to decision performance. In addition, graduated circles were appropriate symbolizations for thematic maps of GIS.

4.1.2 Research area


4.1.3 Total N

The total N of experimental studies in years 1992-2012 in Journal of Marketing varied approximately between 100 and 1350. The smallest total N was 100 respondents in the article of Johnston and Kim (1994). The largest survey was in the experimental study of Ozimec et
al. (2010) where the total N was 1349 respondents. DeCarlo and Leigh (1996) had 218 respondents in their study. Kumar et al. (2008) had 1046 respondents in their study. Palmatier et al. (2009) had 155 respondents in their research process. Between years 1992-2012, the average of the total N was 359 respondents in Journal of Marketing. Thus, the total N was quite large in each study. There were not any experimental studies, where total N was under 100 respondents. Every market of selected article was industrial business market. Thus, every respondent worked or studied in industrial business. Palmatier et al. (2009) and Kumar et al. (2008) had also studies about consumer behavior in their study process. The total N of the each selected articles of Journal of Marketing is listed in table 11. The respondents were mainly managerial level personnel of the firms.

4.1.4 Research process and variables

In each articles, it was clearly mentioned that the researchers used experimental research as their research method in their study. The structures of articles were quite similar compared to each other. Every article was divided in several parts. The first part introduced the issue and hypothesis. The second part usually conversed on methodology such as total N, variables and experiment process. The third part was commonly about analyzing experimental data. The last part discussed about results such as, how independent variables influenced to dependent variable or variables and was there any connections between dependent variables. The most of selected articles of Journal of Marketing used between-subject experimental research design. Johnston and Kim (1994) and Ozimec et al. (2010) used mixed factorial design in their study. DeCarlo and Leigh (1996) used full-factorial between-group design. Kumar et al. (2008) and Palmatier et al. (2009) used between-subjects design.

Table 9 is an example from mixed between-within-subjects experimental design. Ozimec et al. (2010) introduced in this way their experimental design about GIS-based marketing decisions. Each respondent within a map / time pressure group completed four tasks of varying complexity from the domain of retail site selection. Between-subjects were choropleth map, cartogram, proportional symbol map and diagram map. Within subjects were tasks 1-4. The researchers did not tell to participants about the varying degrees of task complexity before the experiment.
Table 9. Mixed between-/within-subjects experimental design (Ozimec et al., 2010).

<table>
<thead>
<tr>
<th>GIS Thematic Maps</th>
<th>Symbolization</th>
<th>Symbol Overload Handling</th>
<th>Resulting Map Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choropleth map</td>
<td>Shading</td>
<td>____</td>
<td>1</td>
</tr>
<tr>
<td>Cartogram</td>
<td>Shading &amp; distortions</td>
<td>____</td>
<td>2</td>
</tr>
<tr>
<td>Proportional symbol map</td>
<td>Circles</td>
<td>Symbol squeezing</td>
<td>3</td>
</tr>
<tr>
<td>Diagram map</td>
<td>Bars</td>
<td>Symbol overlap</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Symbol squeezing</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Symbol dislocation</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

Task Complexity

<table>
<thead>
<tr>
<th>Within Subjects</th>
<th>Similarity of Alternatives</th>
<th>Number of Decision Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1</td>
<td>60%</td>
<td>2</td>
</tr>
<tr>
<td>Task 2</td>
<td>30%</td>
<td>2</td>
</tr>
<tr>
<td>Task 3</td>
<td>60%</td>
<td>6</td>
</tr>
<tr>
<td>Task 4</td>
<td>30%</td>
<td>6</td>
</tr>
</tbody>
</table>

4.1.5 Results of studies

The purpose of the study of Johnston and Kim (1994) was to test the linkages among performance, attribution and expectancy within the general framework. Their experimental studies were both theoretical and managerial important. The aim of DeCarlo and Leigh (1996) was to increase understanding when and under what conditions thoughtful or heuristic attributional processes were essential for performance appraisals. They offered both theoretical and managerial implications. The goal of Kumar et al. (2008) was to provide an assessment of the consequences of implementing a customer-focused sales campaign through field experiments. They offered also managerial implications in their study. Palmatier et al. (2009) experimentally demonstrated the theoretical framework in their study. Ozimec et al. (2010) developed a conceptual framework and outlined an agenda for future research. Main statistical methods are introduced in this work in chapter 2. The most used statistical method was ANOVA. Johnston and Kim (1994), Ozimec et al. (2010) and Palmatier et al. (2009) used ANOVA in their study. DeCarlo and Leigh (1996) used MANOVA as a statistical method. Kumar et al. (2008) used several different methods such as split sample analysis and t-test in their study. The main results of the articles are tabulated in the table 10.
Table 10. Researching areas and main findings of selected articles in JM.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Subject</th>
<th>Theme</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnston &amp; Kim (1994)</td>
<td>Performance, attribution, and expectancy linkages in personal selling</td>
<td>Effect of the salesperson’s attributional process on expectancy estimation of the salesperson</td>
<td>Sales force motivation</td>
<td>Causal attributions can either raise or lower expectancy and it depends on certain underlying conditions. In addition, salespeople’s prior experience may moderate the effect of attribution on expectancy change.</td>
</tr>
<tr>
<td>DeCarlo &amp; Leigh (1996)</td>
<td>Impact of salesperson attraction on sales managers’ attributions and feedback</td>
<td>Effects of sales managers’ behavior to salesperson attraction</td>
<td>Sales force motivation</td>
<td>Task and social attraction affect directly to causal attributions, cognitive effort and decision confidence. In addition, internal attributions mediate the effects of task and social attraction on coercive feedback. Besides, non-punitive feedback is mediated partially but negatively by external attributions.</td>
</tr>
<tr>
<td>Kumar et al. (2008)</td>
<td>Performance implications of adopting a customer-focused sales campaign</td>
<td>How customer-focused sales campaign affects to a firm’s relational and financial performance</td>
<td>Customer focus</td>
<td>The success of a customer-focused sales campaign depends on how well the firm translates the understanding of customer needs into coordinated sales calls.</td>
</tr>
<tr>
<td>Palmatier et al. (2009)</td>
<td>The role of customer gratitude in relationship marketing</td>
<td>How RM actions affect to customer feelings (gratitude, guilt etc.)</td>
<td>Relationship marketing</td>
<td>Gratitude is an important element for understanding how RM investments increase purchase intentions, sales growth and share of wallet.</td>
</tr>
<tr>
<td>Ozimec et al. (2010)</td>
<td>Geographical information systems-based marketing decisions: Effects of alternative visualizations on decision quality</td>
<td>How GIS symbolization effects on decision performance</td>
<td>GIS Symbolization</td>
<td>Type of symbolization effects strongly to decision performance. In addition, graduated circles are appropriate symbolizations for thematic maps of GIS.</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Total N</td>
<td>Data</td>
<td>Unit of analysis</td>
<td>Type of experimental research</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Johnston &amp; Kim</td>
<td>Study 1: 30</td>
<td>Business classes students</td>
<td>Study 1 (laboratory experiment): 15 in the success condition and 15 in the failure condition</td>
<td>True-experimental design: 2 x 2 x 2 mixed factorial design</td>
</tr>
<tr>
<td></td>
<td>Study 2: 30</td>
<td>Actual salespeople in a large data processing company</td>
<td>Study 2 (laboratory experiment): 15 in the success condition and 15 in the failure condition</td>
<td>Study 3 (field experiment): 20 in the success condition and 20 in the failure condition</td>
</tr>
<tr>
<td></td>
<td>Study 3: 40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total: 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DeCarlo &amp; Leigh</td>
<td>218</td>
<td>Survey packets</td>
<td>144 ME managers, 55 OE managers and 19 SME managers</td>
<td>True-experimental design: 2x2x3 full-factorial, between-groups design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pretested three times:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14 sales managers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 fulltime MBA students</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 sales managers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kumar et al.</td>
<td>Study 1: 566 customer</td>
<td>Study 1&amp;2: Customer observation, type of sales campaign</td>
<td>Study 1(field experiment): 283 test group 283 control group 6350 observations</td>
<td>Study 1&amp;2: True-experimental design: between-subjects design</td>
</tr>
<tr>
<td></td>
<td>Study 2: 480 customer</td>
<td></td>
<td>Study 2(field experiment): 240 customers test and 240 control group</td>
<td>Study 1&amp;2: Split-sample analysis, a t-test with Bonferroni adjusted and Hotelling’s T-square test</td>
</tr>
<tr>
<td></td>
<td>Total: 1046</td>
<td></td>
<td></td>
<td>Study 1&amp;2: Split-sample analysis, a t-test with Bonferroni adjusted and Hotelling’s T-square test</td>
</tr>
<tr>
<td>Palmatier et al.</td>
<td>Study 1: 155</td>
<td>A series of multi-item Likert measures</td>
<td>Laboratory experiment: Business undergraduate students</td>
<td>True-experimental design: Between-subjects design</td>
</tr>
<tr>
<td>Ozimec et al.</td>
<td>1349</td>
<td>A series of site selection decisions</td>
<td>Heterogeneous professional and prior GIS experience background respondents</td>
<td>True-experimental design: 7x2 mixed between-within subjects experimental design</td>
</tr>
</tbody>
</table>

Table 11. Main research information of the selected articles in JM.
4.2 Journal of marketing research (JMR)

In the introductions part the summary of two selected articles of JMR are introduced. The order of the introduced articles is in the table 12. After introductions there is discussion about total N, research process, designs, statistical methods and results.

4.2.1 Introductions of the two selected articles

In the first article, Mittal et al. (2002) discovered how issue valence and issue capability effect on decision making in sales situations. There were two true-experimental studies and one survey-based study in this article. In the studies 1 and 2, the participants were undergraduate seniors. These studies lacked on external validity because of using of undergraduate decision makers. The meaning of study 3 was to increase external validity and they used managers and professional at all levels and from different departments of the hospital.

The study 1 was 2 x 2 between-subjects factorial design. The independent variables were manipulated. In study 1, participants took part in a business scenario. They were told a brief about of Acme, a company providing consulting services to retailers. Next they read a memo from the consultant. The memo had two parts. First one was about overall situation of Acme (positive versus negative). The second part was about capability in dealing with the situation (high versus low). After this the participants were asked to think how much money of their discretionary budget they would spend on this issue. They used t-test to make sure that manipulation was successful in issue valence and issue capability. With ANOVA they made sure that there were no confounding variables in manipulation process.

The study 2 was also 2 x 2 between-subjects factorial design. This study was probably quasi-experimental because the authors didn’t mention that the participants were randomly selected. Nevertheless, the independent variables were manipulated. In study 2, the research procedure was quite similar than in study 1. The participant read a memo about Delta. The memo had two parts. First one was about overall situation of Acme (positive versus negative). The second part was about capability in dealing with the situation (high versus low).
Participants were told that the advertising market has a lot of volatility. The decision task was different compared to first study. Participants were told that three of Delta’s clients had asked Morris, the director of sales, to make a presentation. The possibility of success or failure for each of the three clients was varied to indicate different levels of risk. After that participants were then told that they had 100 hours of preparation time that they allocated among these three clients. This served as the dependent measure. Valence and capability were manipulated with the memo. This study not only measured effort allocation but also provided a measure of risk taking and variable focus of attention. They used t-test, ANOVA and MANOVA statistical methods in the study 2.

The study 3 was a survey-based study. It means that instead of manipulating the variables, the simply measured variables using multi-item scales. The survey was administered to the sample through interoffice mail with a cover letter from the hospital administrator. 114 were returned. The respondents and non-respondents were compared on key demographics and were found not to differ. The survey described a scenario about changing demographic trends in the local area. Respondents were asked to read first the scenario and then answer questions. This survey was pretested with five employees of the hospital. In this study the constructs were issue valence, issue capability and issue investment. They used two regression analyses and a factor analysis as statistical methods in the study 3. The study 3 validated the experimental results of study 1 and 2.

These three studies demonstrated that perceptions of issue capability moderate the effect of positive and negative framing on issue investment. In other words, main results of this whole study were that if capability was high then decision makers more likely invest effort to an issue, which is more negatively framed than positively framed. This result works also conversely.

In the second article, Ganesan et al. (2010) discovered with three true-experimental studies how buffering and amplifying of relationship commitment effect on organizational buyers’ intentions. They randomly assigned participants to different experimental conditions in each three experiments. In all conditions, participants assumed the role of a purchasing manager responsible for buying microchips for midsize electronic equipment manufacturers. The
independent variables were commitment and ethical behaviour and dependent variable were switching behaviour.

In study 1, they conducted four separate 2 X 2 between-subjects factorial experiments. The participants were undergraduate students from a large public university. They conducted the four experiments separately to avoid unintended side effects. The first experiment examined the effects of calculative commitment and ethical violations. The second one discovered the effects of affective commitment and opportunism. The third one discovered the effects of affective commitment and ethical violations. The fourth experiment examined the effects of affective commitment and opportunism. They asked participants to evaluate an incumbent supplier and decide whether to switch to an alternative supplier during a year-end performance review. The alternative supplier was introduced as capable of providing the same quality chips as those supplied by the incumbent. Then participants received the commitment manipulation, which were either calculative or affective commitment. They also received information about ethical violations committed by the incumbent supplier.

In the study 2, they conducted also four separate 2 X 2 between-subjects factorial experiments. The participants were executive and working MBA students from two large public universities. They conducted these experiments using an online survey web site. They separated the experiments to avoid unintended side effects of the manipulations. Procedures and manipulations were similar to study 1. Study 2 replicated the findings of study 1 using executive and working MBA students and a different data collection method.

In the study 3, they conducted two between-subject factors design. Study 3 extended the investigation to a field setting. In this study, they measured rather than manipulated commitment. They sampled from a list of purchasing professionals in four Standard Industrial Classification groups. The study was organized into four parts. In first part they asked to identify a current supplier whose products were important to their firm but can be replaced. In second part, they asked participants to imagine that they were reviewing their relationship with the incumbent supplier. After that they asked participants to indicate their likelihood of switching to a new supplier over the next six months. In third part, they asked participants to focus on the relationship with the supplier they described in first part and the researchers manipulated the remaining supplier misbehaviour and measured likelihood of switching
again. Affective commitment did not buffer incumbent suppliers against mild unethical behaviour as it did in other studies. The results of these three studies indicated complex effects of relationship commitment.

4.2.2 Research area

In JMR, there were only two suitable articles. Mittal et al. (2002) was about decision-making and Ganesan et al. (2010) was about industrial relationships. In these two studies, the market was business-to-business market. Researching areas and themes of the selected articles are listed in the table 12.

4.2.3 Total N

The total N of experimental studies in years 1992-2012 in Journal of Marketing Research varied approximately between 375 and 952. The smallest total N was 375 respondents in the article of Mittal et al. (2002). The largest survey was in the experimental study of Ganesan et al. (2010) where the total N was 952 respondents. Between years 1992-2012, the average of the total N was about 221 respondents in Journal of Marketing Research. Thus, there were only two studies in this journal. There were not any experimental studies, where total N was under 100 respondents. Every market of selected article was only industrial business market. Thus, every respondent worked or studied in industrial business.

The total N of the each selected articles of Journal of Marketing Research is also listed in table 13. The respondents were managerial level personnel of the firms or business students.

4.2.4 Research process and variables

In the articles, it was clearly mentioned that the researchers used experimental research as their research method in their study. The structure of articles was quite similar when compared to each other. Every article was divided in several parts. The first part introduced the issue and hypothesis. The second part usually conversed on methodology such as total N, variables and experiment process. The third part was commonly about analyzing experimental data. The last part discussed about results such as, how independent variables influenced to
dependent variable or variables and was there any connections between dependent variables. Both Mittal et al. (2002) and Ganesan et al. (2010) had more than one study in their research process. The both of selected articles of Journal of Marketing Research used between-subject experimental research design. Mittal et al. (2002) accomplished also survey-based study in their third study.

4.2.5 Results of studies

The aim of the study of Mittal et al. (2002) was to demonstrate the effect of positive and negative framing on issue investment. They offered both theoretical and managerial implications in their study. The aim of the studies of Ganesan et al. (2010) was to define when and to what extent commitment buffered, the differential effects of two types of supplier misbehavior, the differential buffering and amplifying effects of two forms of relationships commitment and the theoretical process through which these effects occurred. They offered theoretical implications in their three studies. The main results of the articles are tabulated in the table 12.

Table 12. Researching areas and main findings of selected articles in JMR.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Subject</th>
<th>Theme</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mittal, Ross &amp; Tsiros (2002)</td>
<td>The role of issue valence and issue capability in determining effort investment</td>
<td>Effects of issue valence and issue capability on decision making</td>
<td>Effort investment</td>
<td>In the condition of high capability, decision makers are more likely to invest effort in an issue that is negatively, rather than positively, framed and this worked also conversely.</td>
</tr>
<tr>
<td>Ganesan, Brown, Mariadoss &amp; Ho (2010)</td>
<td>Buffering and amplifying effects of relationship commitment in business-to-business relationships</td>
<td>How buffering and amplifying of relationship commitment effect on organizational buyers’ intentions</td>
<td>Relationship commitment</td>
<td>Both calculative and affective commitment buffer incumbent suppliers against minor mistakes of their own misbehavior but the affective commitment also reliably amplifies the adverse effects of an incumbent supplier’s positive opportunism.</td>
</tr>
</tbody>
</table>
Main statistical methods are introduced in this work in chapter 2. Mittal et al. (2002) used many kinds of statistical methods. They used regression analyses, ANOVA, MANOVA and t-tests. Ganesan et al. (2010) used least square regression as their statistical method. The most used statistical method was regression analysis. The statistical methods are tabulated in table 13.

**Table 13. Main research information of the selected articles in JMR.**

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Total N</th>
<th>Data</th>
<th>Unit of analysis</th>
<th>Type of experimental research</th>
<th>Statistical method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mittal, Ross &amp; Tsiros</td>
<td>Study 1: 200</td>
<td>Study 1: Responses of</td>
<td>Study 1: Memo</td>
<td>Study 1 &amp; 2: 2x2 between-</td>
<td>Study 1: ANOVA, t-test</td>
</tr>
<tr>
<td></td>
<td>Study 2: 61</td>
<td>undergraduate seniors in five marketing strategy classes</td>
<td>Study 2: Memo</td>
<td>subjects design</td>
<td>Study 2: MANOVA, ANOVA, t-test</td>
</tr>
<tr>
<td></td>
<td>Study 3: 114</td>
<td>Study 2: Senior undergraduates</td>
<td>Study 3: Responses of</td>
<td></td>
<td>Study 3: Two regression</td>
</tr>
<tr>
<td></td>
<td>Total N: 375</td>
<td></td>
<td>questionnaire</td>
<td></td>
<td>analyses, factor analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Study 3: Managers and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>professionals at all levels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and from different departments of the hospital Pre-tested with 5 respondents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ganesan, Brown,</td>
<td>Study 1: 440</td>
<td>Study 1: Scale ranging</td>
<td>Study 1: Undergraduate students</td>
<td>Study 1 &amp; 2: True-experimental</td>
<td>Least squares regression</td>
</tr>
<tr>
<td>Mariadoss &amp; Ho</td>
<td>Study 2: 420</td>
<td>Study 2: Online survey</td>
<td>Study 2: Executive and working MBA students</td>
<td>design: four separate 2 x 2 between-subjects factorial experiments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study 3: 92</td>
<td>Study 3: Web-based surveys</td>
<td>Study 3: Purchasing professionals in four Standard Industrial Classification groups</td>
<td>Study 3: True experimental design: Two between-subject factors, each consisting of two levels (mild and severe)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total N: 952</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Industrial Marketing Management (IMM)

In the introductions part the summary of each selected articles of IMM is introduced. The order of the introduced articles is in the table 14. After introductions there is discussion about total N, research process, statistical methods and results.

4.3.1 Introductions of the selected articles

In the first article, De Wulf et al. (2000) have discovered which factors affect to the opening and reading behavior in business-to-business direct mails. They accomplished a field experiment with randomly selected 60 Belgian managers from the customer file of a large European business school. They contacted them by phone. The selection of 38 direct mail characteristics was based upon a review of the results from a qualitative study on mailing characteristics. These characteristics were independent variables in this research. The dependent variables were opening, reading and response behavior.

Data were collected over a period of five weeks. The respondents were asked fill out a written questionnaire about their attitude towards direct mail. Then, the respondents were asked to assemble all mailings received per a day, indicate opening, reading and response behavior on each mailing and send these mailings to the researchers. Data was analyzed with three logistic regression models. The main findings were that with respect to reading behavior, reader characteristics were the main explanatory factors. The characteristics of mailing itself didn’t seem to be of importance for explaining reading behavior. Reading behavior, reader characteristics and situational characteristics were important for response behavior.

In the second article, Larson and Chow (2003) discovered how follow-up mailings and monetary incentives effect on total cost / response rate trade-offs. In their study, they manipulated several response-inducement methods. They mailed out one thousand and eight hundred surveys after all survey recipients were assigned at random to the 18 treatment combinations. They used ANOVA for statistical method. They found guidance for researchers and managers how to conduct mail surveys.
In the third article, Corsaro et al. (2011) discovered how network pictures impact on managerial behavior. They accomplished one pretest and one experimental research. The pretest was used to test the concept operationalization while a large-scale experiment tested the propositions. The aim of the study was to understand if and how specific pertinent network picture characteristics (power, dynamics, broadness and indirectness) were associated with different behavioral choices. In the pretest, they used 85 executive MBA students. The pretest consisted of four stimuli corresponding to all different pertinent network picture characteristics. They were asked to envision being employed by a company called focal firm. They were also asked to consider the scenario to identify how strongly they rated this scenario on each pertinent network picture characteristics.

In the large-scale experiment, participants were 445 international executive MBA students. They were asked to engage in a mental exercise. In this exercise, they were asked by imaging that they were managers in the focal firm to consider the network picture they were provided with as representing the focal firm’s business surroundings. The subjects were randomly allocated to one of the eight stimuli. To avoid biases the researchers used two different manipulations for each network picture characteristics in order to have a control group. The other task for participants was to indicate which of the self-typing options represented the behavioral option best suited for the given scenario. End of the questionnaire the participant’s socio-demographic features were collected. They used a chi-square and phi-test for categorical data. The main result was that only the power showed significant associations with all four network picture characteristics.

4.3.2 Research area

In IMM, there were only three suitable articles. These articles had different subjects. De Wulf et al. (2000) discussed about direct mail behavior of business customer. Larson and Chow (2003) discussed about total costs. Corsaro et al. (2011) talked about business-to-business networks. In these three studies, the market was business-to-business market. Researching areas and themes of the selected articles are listed in the table 14.
4.3.3 Total N

The total N of experimental studies in years 1992-2012 in Industrial Marketing Management varied approximately between 60 and 490. The smallest total N was 60 respondents in the article of De Wulf et al. (2000). The largest survey was in the experimental study of Larson and Chow (2003) where the total N was 491 respondents. Corsaro et al. (2011) had 445 respondents in their study. Between years 1992-2012, the average of the total N was about 270 respondents in Industrial Marketing Management. Thus, there were only three studies in this journal. Every market of selected article was only industrial business market. Thus, every respondent worked or studied in industrial business. The total N of the each selected articles of Industrial Marketing Management is listed in table 15. The respondents were managerial level personnel of the firms or business students.

4.3.4 Research process and variables

In each articles, it was clearly mentioned that the researchers used experimental research as their research method in their study. The structure of articles was quite similar when compared to each other. Every article was divided in several parts. The first part introduced the issue and hypothesis. The second part usually conversed on methodology such as total N, variables and experiment process. The third part was commonly about analyzing experimental data. The last part discussed about results such as, how independent variables influenced to dependent variable or variables and was there any connections between dependent variables.

De Wulf et al. (2000) didn’t clearly mention which experimental design they used in their studies. They told that the study was field experiment. Larson and Chow (2003) mentioned that they used between-subjects design. They had an informal pretest with several practitioners. Corsaro et al. (2011) mentioned that they used factorial design in their study. They pretested their study procedure before they explored real test persons.

4.3.5 Results of studies

The aim of the study of De Wulf et al. (2000) was to help fill the above-mentioned gaps in literature. They offered with their study conceptual framework and managerial implications.
Larson and Chow (2003) had six practical recommendations for industrial marketing management researchers using mail surveys. The aim of the study of Corsaro et al. (2011) was to understand how certain representations of business reality affected managerial action in the Industrial Network Approach. They offered both theoretical and managerial practical implications.

Main statistical methods are introduced in this work in chapter 2. The researchers used different kind of statistical methods in their studies. De Wulf et al. (2000) used three regression analyses in their study. Larson and Chow (2003) used ANOVA in their study. Corsaro et al. (2011) used phi-test and chi-square tests. The main results of the articles are tabulated in the table 14.

In the figure 9 and 10 De Wulf et al. (2000) introduced their conceptual framework and findings of the experiment. From the figures, it can be seen that manipulating envelope characteristics was the most effective way to influence business-to-business direct mail opening behavior. Reader characteristics were the main explanatory factors. The characteristics of the mailing itself didn’t seem to play the important role in determinants of reading behavior. Other essential factor were segmenting and targeting because they stimulate reading and response behavior. Mailing content and reading behavior weren’t related to each other. As a result, reading behavior, reader characteristics and situational characteristics were important determinants of response behavior.
Figure 9. Conceptual model of opening, reading and response behavior. (De Wulf et al., 2000)

Figure 10. Significant antecedents of opening, reading and response behavior. (De Wulf et al., 2000)
Table 14. Researching areas and main findings of selected articles in IMM.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Subject</th>
<th>Theme</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Wulf, Hoekstra &amp; Commandeur (2000)</td>
<td>The opening and reading behavior of business-to-business direct mail</td>
<td>Which factors influence to managers’ behavior towards direct mail</td>
<td>Manager’s direct mail behavior</td>
<td>Manipulating envelope characteristics was the most effective way to influence business-to-business direct mail opening behavior. Other essential factor were segmenting and targeting because they stimulate reading and response behavior. Mailing content and reading behavior were not related to each other.</td>
</tr>
<tr>
<td>Larson &amp; Chow (2003)</td>
<td>Total cost / response rate trade-offs in mail survey research: impact of follow-up mailings and monetary incentives</td>
<td>How follow-up mailings and monetary incentives affect on total cost / response rate trade-offs</td>
<td>Total costs</td>
<td>Follow-up mailings and monetary incentives should be used to maximize response rate. Follow-up mailings are preferred over monetary incentives. If there is limited time for survey administration, monetary incentives may be preferred over follow-up mailings. In addition, follow-up mailings have the added benefit of enabling non-response bias estimation.</td>
</tr>
<tr>
<td>Corsaro, Ramos, Henneberg &amp; Naudé (2011)</td>
<td>Actor network pictures and networking activities in business networks: An experimental study</td>
<td>How network pictures affect on managerial behavior</td>
<td>Business-to-business networks</td>
<td>Power dimension had only significant associations with all four network picture characteristics. The study represented the connection between cognition and behavior in business-to-business markets.</td>
</tr>
</tbody>
</table>
Table 15. Main research information of the selected articles in IMM.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Total N</th>
<th>Data</th>
<th>Unit of analysis</th>
<th>Type of experimental research</th>
<th>Statistical method</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Wulf, Hoekstra &amp; Commandeur</td>
<td>60</td>
<td>Written questionnaire</td>
<td>Belgian managers</td>
<td>Field experiment</td>
<td>Three regression analyses</td>
</tr>
<tr>
<td>Larson &amp; Chow</td>
<td>491</td>
<td>Survey booklet</td>
<td>Purchasing professionals</td>
<td>18 (2 x 3 x 3) between-subject design</td>
<td>ANOVA</td>
</tr>
<tr>
<td>Corsaro, Ramos, Henneberg &amp; Naudé</td>
<td>445</td>
<td>Questionnaire</td>
<td>Executive MBA students</td>
<td>Pretest: experienced managers</td>
<td>Chi-square Phi-test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scenario of manipulated network pictures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pretest: 85</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.4 Journal of the Academy of Marketing Science (JAMS)

In the introductions part the summary of each selected articles of JAMS is introduced. The order of the introduced articles is in the table 16. After introductions there is discussion about total N, research process, statistical methods and results.

4.4.1 Introductions of the selected articles

In the first article, Dorsch and Kelley (1994) discovered impact of gift cost, gift type and buyer-vendor-relationship status on purchasing executive’s feelings of indebtedness, perceived manipulation and intentions of reciprocate vendor gifts. Participants were purchasing executives from United States. The experimental treatments consisted of twelve scenarios and they were identical across the three concrete treatment variables. The manipulated gift characteristics were gift type, and gift cost. Relationship status was manipulated as the percentage of material requirements purchased from the particular vendor during the previous year. They used least square regression to discover effectiveness of the treatment variables. The main result of the study was that buyers should notice that when the buyer-seller-relationship is weak corporate gifts resulted in lower perceptions of vendor manipulation. Contrariwise, inexpensive personal gifts were found to elicit the lowest levels...
of perceived manipulation when the relationship is strong. Dorsch and Kelley (1994) offered research and managerial implications in their study. The purpose of this study was to increase understanding of business gift-giving practices by investigating the effect of vendor gift-giving on the perceptions and intentions of purchasing executives.

In the second article, Smith and Berger (1996) discovered how direct marketing appeals effect on charitable marketing effectiveness. The dependent variables were the response rate and the average dollar donation. The independent variables were suggested anchor point (low / high), factual / statistical reference information (not-present / present), narrative / experiential reference information (not-present / present), and framing valence (negative / positive). The sample consisted of university graduates who were on record as having made at least one previous donation to the university but who had not given during the current fiscal year anything. The main results were that suggested anchors and framing had an impact on response rate but not size of gift. Reference information affected on size of gift but not response rate.

4.4.2 Research area

In JAMS, there were only two suitable articles. The first one (Dorsch and Kelley, 1994) was about decision-making. The second one (Smith and Berger, 1996) was about industrial relationships and gift behavior. In these two studies, the market was business-to-business market. Researching areas and themes of the selected articles are listed in the table 16.

4.4.3 Total N

The total N of experimental studies in years 1992-2012 in Journal of the Academy of Marketing Science varied approximately between 150 and 630. The smallest total N was 151 respondents in the article of Dorsch and Kelley (1994). The largest survey was in the experimental study of Smith and Berger (1996) where the total N was 627 respondents. Between years 1992-2012, the average of the total N was about 389 respondents in Journal of the Academy of Marketing Science. Thus, there were only two studies in this journal. There were not any experimental studies, where total N was under 100 respondents. Every market of selected article was only industrial business market. Thus, every respondent worked or
studied in industrial business. The total N of the each selected articles of Journal of the Academy of Marketing Science is listed in table 17. The respondents were managerial level personnel of the firms or business students.

4.4.4 Research process and variables

In the articles, it was clearly mentioned that the researchers used experimental research as their research method in their study. The structure of articles was quite similar when compared to each other. Every article was divided in several parts. The first part introduced the issue and hypothesis. The second part usually conversed on methodology such as total N, variables and experiment process. The third part was commonly about analyzing experimental data. The last part discussed about results such as, how independent variables influenced to dependent variable or variables and was there any connections between dependent variables. The both of selected articles of Journal of the Academy of Marketing Science used between-subject experimental research design.

4.4.5 Results of studies

The aim of the study of Dorsch and Kelley (1994) was to chance understanding of business gift-giving practices by researching the effect of vendor gift giving on the perceptions and intentions of purchasing executives. They offered managerial and research implications in their study. The aim of the study of Smith and Berger (1996) was to offer the first study about charitable donor choice and estimation specifically from a behavioral decision from theoretic perspective and integrate them into a common conceptual and experimental framework. They offered managerial implications and conceptual framework for behavior decision research.

Main statistical methods are introduced in this work in chapter 2. The researchers used different kind of statistical methods in their studies. Dorsch and Kelley (1994) used least squares regression and hierarchical analysis in their study. Smith and Berger (1996) used ANOVA in their study. The main results of the articles are tabulated in the table 16.
Table 16. Researching areas and main findings of selected articles in JAMS.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Subject</th>
<th>Theme</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsch &amp; Kelley (1994)</td>
<td>An investigation into the intentions of purchasing executives to reciprocate vendor gifts</td>
<td>How gift characteristics and business relationship status effect on purchasing executive’s feelings of willingness to vendor gifts</td>
<td>Buyer-vendor relationship</td>
<td>The likelihood of a business gift being reciprocated depends on the type of vendor gift received. The other factors were the extent to which the buyer experienced a sense of indebtedness and buyer perceptions of the level of manipulation associated with the gift. Other finding was that the level of perceived manipulation associated with a gift was based on considerations of gift cost and type with respect to the relationship status.</td>
</tr>
<tr>
<td>Smith &amp; Berger (1996)</td>
<td>The impact of direct marketing appeals on charitable marketing effectiveness</td>
<td>What factors influence to charitable marketing effectiveness</td>
<td>Behavioral decision</td>
<td>Suggested anchors and framing have an impact on response rate but not size of gift. Reference information affects on size of gift but not response rate.</td>
</tr>
</tbody>
</table>

Table 17. Main research information of the selected articles in JAMS.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Total N</th>
<th>Data</th>
<th>Unit of analysis</th>
<th>Type of experimental research</th>
<th>Statistical method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsch &amp; Kelley</td>
<td>151</td>
<td>Questionnaire / scenarios</td>
<td>Purchasing executives from United States</td>
<td>Between-subjects 3 x 2 x2 full factorial design</td>
<td>Least squares regression (OLS) Hierarchical analysis</td>
</tr>
<tr>
<td>Smith &amp; Berger</td>
<td>627</td>
<td>University graduates</td>
<td>University graduates</td>
<td>Between-subjects $2^{k-1}$ fractional factorial design with eight treatment combinations</td>
<td>ANOVA</td>
</tr>
</tbody>
</table>
4.5 Comparison of four selected journals

In this part all selected 12 articles are compared and analyzed together. The areas of comparison and analyzing were the same as in each journal such as total N and research area. In each journal interesting features have been found out. The meaning of comparison and analyzing is to find out the interesting similarities and differences of the four selected marketing academic journals.

From the distribution of articles from years between 1992 and 2012 it can be seen that in year 1994, 1996 and 2010 there was published the half of suitable experimental research articles of these selected journals. It was published two experimental research articles per these years about industrial business. In years 2000, 2002, 2003, 2008, 2009 and 2011 it was published one article per year about industrial business. There was not any suitable article before year 1994. Besides, in years 1995, 1997-1999, 2001, 2004-2007 and 2012 there also weren’t any suitable articles in any selected marketing academic journals.

4.5.1 Research area

In the selected articles, the most of studies talked about industrial relationships and improved connection to the industrial customer and customer behavior. Other subjects were sales force commitment and motivation and decision-making. Only one article discussed about GIS, total costs and effort investments. So, the relational subjects were more common than organizational subjects. In all 12 studies, the market was business-to-business market. The articles JMR and JAMS were more concentrated to customer-supplier-relationships than JM and IMM.

4.5.2 Total N

The average total N of all 12 selected articles was about 300 respondents. The smallest average of total N was in JMR (221 respondents). The largest average of total N was in JAMS (389 respondents). In JM the average of total N was about 359 respondents. In IMM the average of total N was 270 respondents. In JM the total N varied from 100 to 1349 respondents. In JMR the total N varied from 375 to 952 respondents. In IMM the total N
varied from 60 to 491 respondents. In JAMS the total N varied from 151 to 627 respondents. It can be see that the largest variation of total N and the largest studies were in JM. On the contrary, the smallest variation of total N seems to be in IMM. Thus, IMM had the smallest studies.

Generally speaking, the good total N in JM seems to be about 100-1000 respondents. In JMR the good total N seems to be about 400-900 respondents. In IMM the good variation of total N seems to be about 100-500. In JAMS the good total N seems to be about 150-600 respondents. Some studies had more than one experimental study and four studies had a pretest.

The number of the respondents seemed not to be connected with the subject of study in any journals. It can be said that in each 12 studies only the business area and status of the responders in a firm mattered when the researchers selected their test participants. It is also important to notice that the total N was much smaller than the amount of personnel, which was contacted. There is not any causality between the amount of selected personnel and the design or subject of the study. Almost all of the respondents in all four journals were high level of personnel and worked in industrial business firms or business students.

4.5.3 Research process and variables

The structure of all 12 articles of four journals was quite similar. The first part introduced the issue and hypothesis. This part was to define the research purpose. The second part usually conversed on methodology. In this part, sampling strategy, unit of analysis, research design and pretests were introduced. The third part was commonly about analyzing experimental data. It was common that application of analysis method matched to ensure systematic approach. The last part discussed about results such as, which independent variables influenced to dependent variable or variables and was there any connections between dependent variables. There were also discussion about internal and external validity and implications of the study.

The main ideas of experimental research seemed to be manipulation of independent variable, random assignment, control of extraneous variables, measurement of outcomes, and
discussion about validity. Next there is a deeper discussion about these issues in the selected four journals. In table 18, there is introduction of the nature of experimental research and its quality published in the four selected journals. The most of studies of the journals mentioned only that the research method was experimental research. In Journal of Marketing, it was clearly mentioned whether the study was laboratory experiment or field experiment. The half of articles of the four journals had multiple studies. This means that the number of studies inside the research process was more than one.

The largest research process consisted of three different experimental studies. The Journal of Marketing and Journal of Marketing Research had the largest studies. Every researcher mentioned clearly that they used experimental research method in their study process. The many of researchers used professionals in their studies. It was also very common to use business students and both students and professionals. Surprisingly, only four of articles of the four journals have been pretested. The main used experimental design was between-subject design. That was quite surprising because according to Gilbert et al. (1998, p. 113) within-subjects design is more common used than between-subjects design.

Manipulation check of independent variable was mostly clearly mentioned and described in these journals. Randomization of group participants weren’t very clearly mentioned or described in several articles of the selected journals. Nevertheless, only in three of all selected articles didn’t mention randomization at all. The researchers used mostly more than one statistical method in their research process. Reliability and validity weren’t discussed in every study of the journals. External validity was more clearly discussed than internal validity and reliability. In article of Corsaro et al. (2011) in IMM, they used a pretest due to the necessity of safeguarding the validity and reliability of the instruments used in the final study. The reason to use t-tests in the study was always to find out is there any difference between two test groups. Only two studies of 12 selected articles used t-tests.

In table 19, use of pretest, manipulation and confounding checks and demand artifacts considerations of the four selected journals are viewed more carefully. The table format bases on the article of Khan (2011). Eight of twelve experimental research articles weren’t pretested. Three different pretests were discussed within methodology and one was mentioned within experiment. Manipulation check was mentioned mainly during main experiment and in
separate section. Four manipulation checks of four articles were mentioned after experiment. Only Kumar et al. (2008) in JM mentioned manipulation check after experiment. Only Larson and Chow (2003) mentioned manipulation check within methodology. Two of articles didn’t mention manipulation checks at all. Only Mittal et al. (2002) introduced manipulation checks in separate section in JMR. In this article, the manipulation check had three parts. These parts were issue valence, issue capability and check on orthogonality. Only few researchers mentioned or discussed about confounding check and demand artifact consideration. Besides, these issues weren’t clearly mentioned by researchers. In the article of JM, DeCarlo and Leigh (1996) mentioned the confounding check within the experiment. Four of articles mentioned confounding check as a limitation.

Demand artifact consideration was mentioned mainly as a limitation. Demand artifact consideration was mentioned once within methodology and once in separate section in selected journals. Corsaro et al. (2011) in IMM reduced the potential effects of other intervening variables with pretest. In JAMS, Dorsch and Kelley (1994) minimized confounding variables by developing scenarios in which the gift-giving conditions were essentially identical across treatments in experiment.

In table 20, is introduction of main experimental research process in selected journals and what the researcher should decide in each phases of the research process. In addition, there are some practice recommendations for researchers. Information of table 19 is based on the findings of this work. At beginning of the introduction of research process, the researcher should introduce the research purpose with defining the hypotheses and introducing the conceptual framework. After that, the researcher should introduce research methodology. In experimental research article, it was essential to introduce especially manipulation check and randomization and sampling process so that the experimental research can be replicated. Data analyzing process consisted mainly of defining of statistical method. Results and implications consists managerial and/or theoretical implications and discussion of verification of the study process such as about validity and reliability.
Table 18. The nature of experimental research and its quality published in the four journals.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental type used in each individual study process</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory experimental</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td>Field experimental</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td>Not mentioned</td>
<td>9</td>
<td>75%</td>
</tr>
<tr>
<td><strong>Number of studies inside the research process</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>6</td>
<td>50%</td>
</tr>
<tr>
<td>Multiple</td>
<td>6</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Explicit justification of experimental research method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>100%</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Unit of analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business students</td>
<td>2</td>
<td>16,7%</td>
</tr>
<tr>
<td>Professionals</td>
<td>6</td>
<td>50%</td>
</tr>
<tr>
<td>Both</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td>Other (memo)</td>
<td>1</td>
<td>8,3%</td>
</tr>
<tr>
<td><strong>Pretested</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>33,3%</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>66,6%</td>
</tr>
<tr>
<td><strong>Experimental design</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between-subject design</td>
<td>9</td>
<td>75%</td>
</tr>
<tr>
<td>Within-subject design</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Mixed design</td>
<td>2</td>
<td>16,7%</td>
</tr>
<tr>
<td>Other/not clearly mentioned</td>
<td>2</td>
<td>16,7%</td>
</tr>
<tr>
<td><strong>Variable manipulation process described explicitly</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11</td>
<td>91,7%</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>8,3%</td>
</tr>
<tr>
<td><strong>Randomizing process described explicitly</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>75%</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Statistical method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only one</td>
<td>8</td>
<td>66,7%</td>
</tr>
<tr>
<td>More than one</td>
<td>4</td>
<td>33,3%</td>
</tr>
<tr>
<td><strong>Reliability explicitly addressed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td>No</td>
<td>9</td>
<td>75%</td>
</tr>
<tr>
<td><strong>Validity explicitly addressed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>41,7%</td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>58,3%</td>
</tr>
<tr>
<td><strong>External validity explicitly considered</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>41,7%</td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>58,3%</td>
</tr>
</tbody>
</table>
Table 19. The use of pretest, manipulation and confounding check and demand artifacts considerations in the selected journals.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pretest</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No pretest</td>
<td>8</td>
<td>66.6%</td>
</tr>
<tr>
<td>Within methodology</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td>Within experiment</td>
<td>1</td>
<td>8.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Manipulation check</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No check</td>
<td>2</td>
<td>16.6%</td>
</tr>
<tr>
<td>Within methodology</td>
<td>1</td>
<td>8.3%</td>
</tr>
<tr>
<td>Separate section devoted</td>
<td>4</td>
<td>33.3%</td>
</tr>
<tr>
<td>During main experiment</td>
<td>4</td>
<td>33.3%</td>
</tr>
<tr>
<td>After experiment</td>
<td>1</td>
<td>8.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Confounding check</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No check</td>
<td>4</td>
<td>33.3%</td>
</tr>
<tr>
<td>Within the experiment</td>
<td>4</td>
<td>33.3%</td>
</tr>
<tr>
<td>Discuss as limitation</td>
<td>4</td>
<td>33.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Demand artifact consideration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No consideration</td>
<td>5</td>
<td>41.7%</td>
</tr>
<tr>
<td>Separate section devoted</td>
<td>1</td>
<td>8.3%</td>
</tr>
<tr>
<td>Within the experiment</td>
<td>4</td>
<td>33.3%</td>
</tr>
<tr>
<td>Discuss as limitation</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 20. Research process and guidance, which based on findings of the four journals.

<table>
<thead>
<tr>
<th>Phases of experimental research process</th>
<th>Key decisions</th>
<th>Practice recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining the hypotheses and introducing the conceptual framework</td>
<td>Research purpose</td>
<td>Clarity of research purpose: Theoretical/practical or both Theory development prior to data collection</td>
</tr>
<tr>
<td>Research methodology</td>
<td>Sampling strategies</td>
<td>Use of literal or theoretical replication</td>
</tr>
<tr>
<td></td>
<td>Using of pretests</td>
<td>Specification of sampling source: Students or professionals or both</td>
</tr>
<tr>
<td></td>
<td>Unit of analysis</td>
<td>Specification of unit of analysis: Professionals groups, business organizations, business units, elements of marketing strategy such as a memo</td>
</tr>
<tr>
<td></td>
<td>Selecting research design</td>
<td>Between-subject design or within-subject design or mixed design</td>
</tr>
<tr>
<td></td>
<td>Randomization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defining of independent and dependent variables of the research subject</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manipulation of independent variable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control of extraneous variables</td>
<td></td>
</tr>
<tr>
<td>Data analyzing process</td>
<td>Method/process of data analysis</td>
<td>Application of analysis method matching to ensure systematic approach</td>
</tr>
<tr>
<td></td>
<td>Choosing of statistical method</td>
<td></td>
</tr>
<tr>
<td>Results and implications</td>
<td>Effectiveness of the manipulation</td>
<td>Choice of report structure should be aligned to research purpose</td>
</tr>
<tr>
<td></td>
<td>Method verification</td>
<td>Internal validity/external validity</td>
</tr>
<tr>
<td></td>
<td>Managerial implications</td>
<td>Reliability</td>
</tr>
<tr>
<td></td>
<td>Theoretical implications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Future research</td>
<td></td>
</tr>
</tbody>
</table>

4.5.4 Results of studies

The articles of every journal offered good theoretical and managerial implications for the subject. In table 21, is introduction of how authors used the experimental research best, common and innovative practices in their experimental studies in these four selected journals. The way of using of best practice was that the authors provided the bridge between their research effort and theory. The common practice seemed to offer key methodological details
about methods of analysis and the researchers didn’t discuss usually about verification. The linear approach in terms of reporting findings was most common in these journals. The researchers used both business students and professionals in their study. The innovative practice seemed to be combination of different analysis method and combination of research design. In addition, discovering both business-to-business and business-to-consumer context seemed to increase internal and external validity.

**Table 21. Ways to use experimental research by authors.**

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>Way of using</th>
</tr>
</thead>
</table>
| **Best practice**      | • The authors provided a linkage between their research effort and theory  
                         • The authors explained the process of data analysis  
                         • The authors found causality between independent and dependent industrial business variables |
| **Common practice**    | • Key methodological details about methods of analysis and verification usually not discussed in the article  
                         • The linear approach in terms of reporting findings was most common.  
                         • Sampling consisted of both students and professionals |
| **Innovative practice**| • Combination of different analysis method: ANOVA and regression analysis  
                         • Combination of research designs: mixed factorial designs  
                         • Using mixed research method: Both experimental design and survey-based field data collection (For example Parmatier et al. 2009)  
                         • Discovering B2C and B2B in same time - Better internal and external validity (For example Parmatier et al. 2009) |
The two most used statistical methods were ANOVA and regression analysis. Regression analysis was the second most used statistical method. MANOVA and t-test were the thirdly most used statistical method. Other used methods were least squares regression, hierarchical analysis, chi-square and phi-test.

In the table 22 all observations of the four journals are collected and compared. It is introduced how total N, respondents, research subjects, research process and results differ from each other and what kind of similarities it can be seen in the four academic journals. In JAMS, there were only simple studies. Total N variation was quite different between the four selected journals. Respondents, research subjects and results seemed to be quite similar.

**Table 22. The comparison of the four academic marketing journals.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total N</strong></td>
<td>The variation of size quite large: 100-1349</td>
<td>Large sizes: 375-952</td>
<td>The variation of size quite large: 60-491</td>
<td>Large sizes: 151-627</td>
</tr>
<tr>
<td><strong>Respondents</strong></td>
<td>Connected to the subject, managerial level personnel in industrial business firms or business students</td>
<td>Connected to the subject, managerial level personnel in industrial business firms or business students</td>
<td>Connected to the subject, managerial level personnel in industrial business firms or business students</td>
<td>Connected to the subject, managerial level personnel in industrial business firms</td>
</tr>
<tr>
<td><strong>Research process</strong></td>
<td>Many studies in an article, long experiment procedures Design: Between-subjects</td>
<td>Many studies in an article, long experiment procedures Design: Between-subjects</td>
<td>Many study in an article, long experiment procedures Design: Different kind of designs</td>
<td>One study, simple experimental studies Design: Between-subjects</td>
</tr>
<tr>
<td><strong>Research subjects</strong></td>
<td>Subjects were about B2B markets. In general they were about sales force and industrial relationships</td>
<td>Subjects were about B2B markets. In general they were about industrial relationships and decision making</td>
<td>Subjects were about B2B markets. In general they were about industrial relationships and firm performance</td>
<td>Subjects were about B2B markets. In general they were about industrial relationships and customer behaviour</td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td>Managerial implications and conceptual frameworks</td>
<td>Managerial implications and conceptual framework</td>
<td>Managerial implications and conceptual frameworks</td>
<td>Managerial implications and conceptual frameworks</td>
</tr>
</tbody>
</table>
5 CONCLUSION AND DISCUSSION

The main objective of this work was to discover and analyze characteristics of the experimental study method. In addition, the aim was to find out how experimental study have been used in four academic marketing journals and discover examples of how experimental study have been used in business-to-business context. The benefit of this work is that it offers a deeper understanding to the nature of experimental study method. In addition, it offers useful examples of the usage of experimental study in industrial business context. The valuable information in this work could be collected and analyzed so that a researcher could get guidance for industrial business study of one’s own.

First, a literature review talked about experimental study and its benefits to industrial business research. There was description of the features and ways to use of the experimental study. There is a diverse description about what is experimental study. The aim of experimental research method is to find out the causality of two or more factors. The control variables or control groups were necessary to make sure that any other factors did not influence in the phenomenon except the selected factors. Experimental study is very suitable for discovering industrial business challenges. Especially it suits well for discovering industrial relationships and customer behavior. Nevertheless, it is used usually for exploring consumer behavior. The researchers have more challenges when they discover industrial marketing compared to consumer marketing. It is harder to collect enough relevant data for the research. In addition, the unit of analysis is more complex in industrial marketing than consumer marketing. It is harder to discover processes of an organization than behavior of one person. The chapter 2 offers answers especially to the research question 1.

The experimental part of the work included introductions and analysis of the 12 selected experimental study articles of four valued academic marketing journals. In the end there is also the comparison of the selected journals where the total N, research subjects, research processes and results of the journals are compared. The chapter 3 introduced the data retrieval process of this thesis and chapters 4 and 5 introduced the analyzing process of this work. Especially chapter 4 and 5 offer answers to the research question 2.
The chapter of the conclusions introduces final findings of the thesis. The conclusions are divided into two parts. The first part answers to the first research question and the answer includes essential information about the usage and the nature of the experimental study so that a researcher gets a good understanding about what is experimental study. The second part answers to the second research question and the answer includes interesting findings about the usage of experimental study in industrial market context. This chapter also addresses the limitations of this work and makes suggestions for future research. There is also a short discussion about the future of the usage of experimental study in industrial business context.

5.1 Research finding

1. What experimental research is?

The key ideas of experimental research are random assignment, control of extraneous variables, manipulation of treatment, measurement of outcomes, comparison of participant groups and possible threats of validity. An experimental effect is produced if the independent variable causes a change in the dependent variable. The meaning of experimental control is to predict events that will occur in the experimental setting by neutralizing the effects of other factors. (Cardwell, 1999, p. 69-122)

Experimental research is based on manipulation of an independent variable. The researcher tries to hold the all other variables except the dependent variable. The independent variable is some aspect of the experimental situation that the researcher manipulates in order to see if it causes a change in some other behaviour. The dependent variable is some aspect of behaviour that is affected by the action of the independent variable in an experiment. (Cardwell, 1999, p. 69-122)

There are three ways to manipulate independent variable. The first way is to manipulate it by presenting a condition or treatment to one group and withholding the condition or treatment from another group. This is called the presence or absence technique. (Atkinson et al., 1996, p. 19) The second one is that the researcher can manipulate independent variable by varying the amount of a condition or variable. This is called the amount technique. The third way is to
Manipulate the independent variable by varying the type of the treatment administered. This one is called the type technique. (Dr. Price & Dr. Oswald, 2006) These are also straightforward manipulations and staged manipulations. Straightforward manipulations manipulate variables with instructions and stimulus presentations. Stimuli may be presented verbally, in written form, via videotape or with a computer. Most of manipulations of independent variables in all areas of experimental research are straightforward. The other type of manipulation is staged manipulations. Sometimes it is necessary to stage events during the experiment in order to manipulate the independent variable successfully. (Cozby and Bates, 2011)

It is important to make sure that there are not any other factors that could influence in the measurable factors. Random assignment is the best way to control because by randomly forming groups, the groups may be probably equated on all known and unknown variables at the start of the experiment. Random assignment helps the researcher to produce internal validity and random selection helps to produce external validity. The difficulty of clearly explaining the outcome of research varies inversely with the degree of control that comes through randomization. (Kirk, 2013, p. 6-7)

There are several ways to control extraneous variables. The first one is to eliminate the variable as a variable. This control method is the easiest if it is possible to do. The researcher can eliminate the effect of a possible influential independent variable on a dependent variable by choosing subjects so that they are as homogeneous as possible on that independent variable. This method of controlling unwanted or extraneous variance is very effective. The second way to control extraneous variance is through randomization. Theoretically, this way is the only method of controlling all possible extraneous variables. This method bases on the idea that if randomization has been accomplished, then the experimental groups can be considered statistically equal in all possible ways. This does not mean that the groups are equal in all the possible variables. The control of the extraneous variance by randomization is a powerful method of control. (Kerlinger, 1986, p. 287-288)

Meaning of experiments is to collect data about well-defined phenomenon from well-observant circumstance. Types of experiments are laboratory experiment and field experiment. Experimental research is quantitative way to discover. It means that the data
represents universe statistically. The data collection, treatment and analyzing process are separated from each other. The data is strictly limited and it can be introduced with numbers. The experiment can be replicated and validity and reliability are very important to experimental research. The nature of experimental research is to question the existing theory. (Uusitalo, 2001, p. 64-81)

There are three major types of experimental design. One is the repeated measures design, which means that all participants take part in all conditions. Other one is matched subjects design, which means that an attempt is made to relate the participants in some way. They are matched in terms of whatever the researcher notices an effect on their performance and mask the effect of the independent variable. The third type is the independent subject design, which means that participants are randomly allocated to different conditions. The researcher does that so that if participant variables do have an effect on performance on the task, they do not do so in any systematic manner. (Cardwell, 1999, p. 93-94)

The researcher should know the differences between experimental and quasi-experimental research methods. Sometimes it is much easier to discover the research subject with quasi-experimental research instead of experimental research. The significant difference between experimental research and quasi-experimental research seemed to be that randomization of groups and manipulation of independent variable weren’t necessary in quasi-experimental research. The significant similarity of both experiments and quasi-experiments was the measuring of the dependent variable. Quasi-experiments often involve a number of strategies to compare subjectivity better than experimental research (Shadish et al. 2002, p. 14). In testing, both types of experiments use ANOVA and ANCOVA tests to measure differences between control and experimental groups, as well as different correlations between groups. Experiments usually have good internal validity comparing to quasi-experiments that have somewhat less interval validity (Kenny, 1975).

Limitation of experimental research is its artificiality. It seemed to be impossible to accomplish an experiment that is high in both internal and external validity. If the researcher controls the experiment to the point of being sterile, the experiment may fail to involve participants, have little impact on them and therefore may not affect their behavior to any great extent. Then the results will be hard to generalize to other settings. (Gilbert et al., 1998,
There are four limitations in experiments. The first one is reactivity effect if participants know they are in an experiment. There is also possibility to ethical problems if not. The second one is limits the kind of phenomena that can be investigated because variables must be tight in operational definition and conditions can therefore be quite artificial. The third one is that participant’s contribution completely prescribed. This means that there won’t be maybe any unique view from participants. The fourth one is that the researcher can invest results with false scientific credibility. Coolican (2004, p. 62)

1. How experimental research can be used in industrial marketing?

While existing company data might answer what happens during any given year, an experiment can explain why something happens (Nobel, 2011). Experimental research seemed to be very useful for discovering reasons behind the phenomena. From this work, it can be seen that the most usable situation to use experimental study in industrial business context seems to be to discover industrial relationships and customer behavior. Nevertheless, the amount of suitable articles was quite small in this work. There are several challenges in using experimental research for these subjects in business marketing. It is very hard to find right participants to the experiment from the global industrial firms. The researcher should know the principles of the selected business industrial and know the organization before researching. There is also a risk in business-to-business experiments that the participant tells only own opinion and it won’t represent the opinion of the whole company.

From this work results, it can be seen that with experimental research the researcher can discover factors, which influence to the choosing for example suppliers. Nevertheless, there is always a risk that there will be other factors that influence with the observed factors in the same time in industrial experiments. The researcher can discover the effects of sales person behavior to the buying process in industrial relationships. Experimental research seems to be suited for discovering both organizational and business subjects. Experimental research can help to discover different customer segments so that the company can make more effectively essential marketing decisions. The way to use experimental research in industrial business situations can be for example to discover direct mail behavior of the industrial customer. With experimental research, the researcher can determine the best number of business-to-business sales calls to make (Patzer, 1996, p. 5). Besides, it can be used to discover for example
effectiveness of organizational segments inside the company and increase understanding from internal leaderships and communication.

The experimental research may help to increase understanding of business customers’ needs and will increase the commitment to them. The way to use experimental research is to research causalities between two or more factors. It suits for industrial business situations in which the researcher can define essential variables and manipulate independent variable. Nevertheless, random sampling is important to accomplish carefully. In complex organizational processes, the researcher should control extraneous variables very carefully. It can be seen from this work that the researcher should familiarize carefully to the research subject so that the participants will be right selected and extraneous and confounding variables will be well controlled. The researchers should also be careful with manipulating the independent variable.

According to Corsaro et al. (2011), the researchers use more commonly in-depth interviews, surveys or direct observations as research methods in business marketing. Corsaro et al. (2011) used experimental research because these other named methods were not as appropriate as experiments for studying phenomena related to manager’s cognition. According to Shiv & Fedorikhin (1999), the reasons for lack of business marketing experimental research are problems of data access and concept operationalization.

Experimental research seems to suit well in discovering industrial business challenges. Nevertheless, there are many important things to notice before starting experimental research process. The experimental research seems to need much knowledge before starting it and it may be suit better for experienced researchers.

2. What kinds of industrial articles about using experimental study have been published in the selected journals in years 1992-2012?

The most of suitable experimental research articles were published in 21th century in JM. There were more suitable articles from 21th century than 90’s. The researchers mainly didn’t mention the type of experiment they used in their studies. In JM it was generally clearly mentioned whether the researchers used field experiment or laboratory experiment. Three of
twelve articles used laboratory experiment and three of twelve articles used field experiment in these four journals. The main subjects were industrial relationships and business customer behavior. Other subjects were sales force motivation, total costs, decision-making, GIS and effort investment. Relationships seem to be mainly discovered in business-to-business studies. The studies concentrated to discover more relationships than organizational subjects.

The good total N seems to be about 300 respondents. The criterion to choose respondents was the status of the industrial personnel and the industry of the firm or business studies. The respondents always were connected to the subject. Many of the researchers used professionals as unit of analysis in their studies. It was also very common to use business students and both students and professionals. Some of the research processes had many studies. The meaning of using many studies in the same article was to increase external validity. External validity was more clearly discussed than internal validity and reliability.

The number of studies inside the research process was mostly one. The largest research process consisted of three different experimental studies. The Journal of Marketing and Journal of Marketing Research had the largest studies. The Journal of Marketing had also studies, which discovered both business-to-business marketing and consumer marketing. The most of studies were accomplished only in business-to-business context. Nevertheless, there were also two different studies with both business-to-business context and business-to-consumer context in JM.

Manipulation check of independent variable was mostly clearly mentioned and described in these journals. Manipulation check was mentioned mainly during main experiment and in separate section. Four manipulation checks of four articles were mentioned after experiment. In other studies manipulation check was mentioned after experiment or within methodology. Randomization of group participants weren’t very clearly described in articles of the selected journals. Nevertheless, randomization was mentioned in the most of studies. Only few researchers mentioned or discussed about confounding check and demand artifact consideration. Besides, these issues weren’t clearly mentioned by researchers. Confounding check was mentioned mainly within the experiment and as a limitation. Demand artifact consideration was mentioned mainly as a limitation.
The researchers used mostly more than one statistical method in their research process. The most used way to analyze experimental data is to use ANOVA. Surprisingly, only four of the articles of the four journals have been pretested. The most used experimental design was between-subject design. The reason to use t-tests in the study was always to find out if there is any difference between two test groups. Only two studies of 12 selected articles used t-tests. Reliability and validity weren’t discussed in many studies of the journals.

The structure of a typical experimental research seemed to include four parts in all 12 articles. The first part introduced the issue and hypothesis. The second part usually conversed on methodology such as total N, variables and interview process. The third part was commonly about analyzing experimental data. The last part considered about results such as, which dependent variables influenced to independent variable or variables and was there any connections between dependent variables. The quality, amount and level of the variables seem to depend on the study. The articles of the four journals concentrated to create theoretical and managerial implications about the subject.

At beginning of the introduction of research process, the researcher should introduce the research purpose with defining the hypotheses and introducing the conceptual framework. After that, the researcher should introduce research methodology. In experimental research article, it was essential to introduce especially manipulation check and randomization and sampling process so that the experimental research can be replicated. Data analyzing process consisted mainly of defining of statistical method. Results and implications consists managerial and/or theoretical implications and discussion of verification of the study process such as about validity and reliability.

The way of using of the best practice seemed to be that the authors provided the bridge between their research effort and theory. The most common practice seemed to offer key methodological details about methods of analysis and the researchers didn’t discuss usually about verification. The linear approach in terms of reporting findings was most common in these journals. The most innovative practice seemed to be combination of different analysis method and combination of research design and research methods such as field surveys and field experimental research. In addition, discovering both business-to-business and business-to-consumer context seemed to increase internal and external validity.
5.2 Limitations and suggestions for further research

Limitation of this work is that it doesn’t discuss about consumer studies. There are a lot of experimental studies that talks about consumer buying behavior. Other limitation is that this work introduces only articles of four marketing journals. The amount of the articles was also quite small: only 12 suitable articles were found. Nevertheless, it seems that the studies are quite similar to each other in these four journals and it is expected that the studies are quite standardized.

This work does deeply introduce the research design or research process of the studies of selected articles. The aim of this work was to offer understanding about the nature of experimental study and good introduction of references so that a researcher could develop own experimental study design with the data. Nevertheless, this work doesn’t offer clearly solutions to use experimental study in practice. The other limitation is also that the work is focused only discovering the usage of experimental research and other quality research methods are limited from this work.

The interesting research direction could be discovering how common it is to use experimental research method compared to other quality research methods in industrial business context. It could also be interesting to research how many studies are mixed of experimental study and other research method. Furthermore, it could be interesting to find out how experimental research has changed over the decades and has it influenced other new study types. Other suggestions for further research are developing new ways to use experimental research in industrial market context. Developing a standardized way of study is a good research direction because the standardization makes it easier to replicate the study and increase the trustworthiness of study.

It seems that the usage of experimental research method in business-to-business context has been increased in 21th century. Instead of asking firms to provide data for the researchers to analyze, increasingly the researchers and companies do experiments together (Nobel, 2011). The future of experimental study seems to be that the researchers will use this research method in same level or a little bit more in industrial business studies over the next years.
Moreover, it will probably be used more in the studies of consumer buying behavior than industrial business cases. The challenges of data collecting and unit of analysis in discovering industrial business versus consumer business won’t probably become easier to handle in the future because of complex processes inside firms.

In table 23 there is guidance for helping a researcher for choosing the journals for searching examples to design an experimental study in industrial business context. There were only clearly differences in total N between the four selected journals. Nevertheless, there were only 12 suitable articles from the four selected journals in this work.

**Table 23.** Guidance for choosing the journals to use as example by a researcher.

<table>
<thead>
<tr>
<th></th>
<th>Journal of marketing</th>
<th>Journal of Marketing Research</th>
<th>Industrial Marketing Management</th>
<th>Journal of Academy of Marketing Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research subject</td>
<td>Sales force and industrial relationships</td>
<td>Industrial relationships and decision making</td>
<td>Industrial relationships or organizational subjects</td>
<td>Industrial relationships and customer behaviour</td>
</tr>
<tr>
<td>Total N</td>
<td>Different kind of sizes</td>
<td>Large studies</td>
<td>Different kind of sizes</td>
<td>Medium studies</td>
</tr>
<tr>
<td>Research design</td>
<td>Between-subject design</td>
<td>Between-subject design</td>
<td>Between-subject design</td>
<td>Between-subject design</td>
</tr>
<tr>
<td>Statistical method</td>
<td>ANOVA</td>
<td>ANOVA</td>
<td>ANOVA/regression analysis</td>
<td>ANOVA/regression analysis</td>
</tr>
<tr>
<td>Results</td>
<td>Studies that offer managerial implications, conceptual frameworks and research findings for future research</td>
<td>Studies that offer managerial implications and conceptual frameworks and research findings for future research</td>
<td>Studies that offer managerial implications and conceptual frameworks and research findings for future research</td>
<td>Studies that offer managerial implications and conceptual frameworks and research findings for future research</td>
</tr>
</tbody>
</table>
REFERENCES


