Introductory Methods of Analysis

George Self

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Preface

I have taught BASV 316, *Introductory Methods of Analysis*, online for the University of Arizona in Sierra Vista since 2010 and enjoy working with students on research methods. From the start, I wanted students to work with statistics as part of our studies and carry out the types of calculations that are discussed in the text. As I evaluated statistical software I had three criteria:

- **Open Educational Resource (OER)**. It is important to me that students use software that is available free of charge and is supported by the entire web community.
- **Platform**. While most of my students use a Windows-based system, some use Macintosh and it was important to me to use software that is available for all of those platforms. As a bonus, most OER software is also available for the Linux system, though I am not aware of any of my students who are using Linux. Finally, I occasionally have students who are not able to load software on their personal computers (think: *Chromebook*) so I needed an online capability.
- **Longevity**. I wanted a system that could be used in other college classes or in a business setting after graduation. That way, any time a student spends learning the software in my class will be an investment that can yield results for many years.

R (just a single letter, *R*) met those objectives and that is the software I chose to use. This manual started as a series of six lab exercises using *R* but has grown over the years to the ten topics covered in this edition. Moreover, *R* is a recognized standard for statistical analysis and could be easily used for even peer-reviewed published papers. It is my hope that students will find the labs instructive and they will then be able to use *R* for other classes.

This lab manual is written with *Bookdown* tools in *RStudio*. It is published under a *Creative Commons 0 Universal* license, essentially "public domain," (see [Creative Commons License]) with a goal that other instructors can modify and use it to meet their own needs. The source can be found at GITHUB and I always welcome comments. Finally, it was written with base R (R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.).

–George Self

Chapter 1

Introduction

1.1 Objectives

1. Identify the various sources of knowledge
2. Define "science"
3. Describe the scientific method and relate that to business research
4. Identify the three types of science research (exploratory, descriptive, and explanatory)

1.2 Knowing

In general, people want to know about things. Most people are curious about the world around them but business owners are interested in specifically how people can be persuaded to make a purchase. Understanding how one person can walk past a candy store without even the slightest thought about going inside while another cannot seem to walk in the same block without stopping in for a treat is valuable information for the owner of the candy store. In general, business owners are eager to know about people and what drives their behavior.

The goal of this book is to teach students how research can be used to help business owners make good decisions. More specifically, the book examines the ways that researchers come to understand the impetus that drives purchases. The research methods considered in this book are a systematic process of inquiry designed to learn something of value about a business problem. Before considering research methods, though, it is useful to contemplate other sources of knowledge.

1.2.1 Different Sources of Knowledge

As an introduction to the field of research, it is useful to briefly consider common sources of knowledge.

1. Assumptions. Many people assume that children without siblings are rather spoiled and unpleasant. In fact, many people believe that the social skills of only children will not be as well developed as those of people who were reared with siblings. However, sociological research shows that children who grow up without siblings are no worse off than those with siblings when it comes to developing good social skills [1]. Researchers consider precisely these types of assumptions that "everyone knows" when investigating their worlds. Sometimes the assumptions are correct and other times not so much.

[1] Bobbitt-Zeher, Donna, and Douglas B. Downey. "Number of siblings and friendship nominations among adolescents." Journal of Family Issues 34.9 (2013): 1175-1193.

2. Direct Experience. One source of knowledge is direct experience. Mark Twain observed that "… the cat that sits down on a hot stove-lid … will never sit down on a hot stove-lid again…" [2] Direct experience may be a source of accurate information, but only for those who experience it. The problem is that the observation is not deliberate or formal; rather, it comes as an accidental by-product of life. Even worse, the lesson learned may be wrong. Without a systematic process for observing and evaluating those observations any conclusions drawn are suspect.

3. Tradition. Another source of knowledge is tradition. There is an urban legend about a woman who for years used to cut both ends off of a ham before putting it in the oven [3]. She baked ham that way because that was the way her mother did it, so clearly that was the way it was supposed to be done. Her mother was the authority, after all. After years of tossing cuts of perfectly good ham into the trash, however, she learned that the only reason her mother ever cut the ends off ham before cooking it was that her baking pan was not large enough to accommodate the ham without trimming it. Tradition may or may not be a good source of knowledge.

4. Authority. Many people rely on the government, teachers, and other authority figures to dispense knowledge. Unfortunately, authority figures may or may not be a source of accurate knowledge.

5. **Observation**. People rely on their own informal observations of their worlds. Occasionally, someone will decide to "investigate"" something, perhaps an odd sound, and their observations will become more selective. Unfortunately, these types of observations are not systematic and may easily lead to incorrect conclusions.

6. Generalization. Often a broad pattern is observed and people draw a conclusion that the pattern is true for all instances. This can be the source of prejudice where the actions of a few bad actors may bias peoples' knowledge of the whole.

While there are many ways that people come to know what they know, some of those ways are more reliable than others. The goal of formal research is to ferret out an accurate answer to the questions people have — to provide a reliable source of knowledge.

1.2.2 What is science?

Most research methods used for business and marketing are based on methods used in the various social sciences and this section of the book describes how that scientific research is conducted.

Many students assume that "science" is a craft practiced by highly educated experts wearing white lab coats and pouring boiling liquids into test tubes. Unfortunately, that is not an accurate definition of "science." Etymologically, the word "science" is derived from the Latin word *scientia*, which means knowledge. "Science," then, is a systematic and organized body of knowledge acquired by using a specific, rigorous method in any field of inquiry. The sciences can be grouped into two broad categories: natural and social. Natural science is the science of naturally occurring objects or phenomena, such as light, objects, matter, earth, celestial bodies, or the human body. Natural sciences are further classified into the physical sciences, earth sciences, life sciences, and others. In contrast, social science is the science of people or collections of people, such as groups, firms, societies, or economies, and their individual or collective behaviors. Social sciences can be classified into disciplines such as psychology (the science of human behaviors), sociology (the science of social groups), and economics (the science of markets and economies).

Sciences are also classified by their purpose. Basic sciences, also called pure sciences, are those that explain the most basic objects and forces, relationships between them, and laws governing them. Examples include physics, mathematics, and biology. Applied sciences, also called practical sciences, are sciences that apply scientific knowledge from basic sciences to a physical environment. For instance, engineering is an applied science that applies the laws of physics and chemistry to practical applications such as building stronger

[2] Twain, Mark. Following the equator. Trajectory Inc, 2014. Found at (https://fada.birzeit.edu/jspui/bitstream/20.500.11889/4989/1/following_the_equator___a_journey_around_the_world.pdf)

[3] See Snopes: (http://www.snopes.com/weddings/newlywed/secret.asp)

bridges or fuel efficient combustion engines, while medicine is an applied science that applies the laws of biology to relieving human ailments.

Scientific knowledge is a generalized body of laws and theories acquired using the scientific method to explain a phenomenon or behavior of interest. Closely related to laws and theories are hypotheses.

- Laws are observed patterns of phenomena or behaviors and are based on repeated experimental observations. They are generalized rules that explain observations and are, typically, theories that have been repeatedly tested and believed to be true. As an example, the Newtonian Laws of Motion describe what happens when an object is in a state of rest or motion (Newton's First Law), what force is needed to move a stationary object or stop a moving object (Newton's Second Law), and what happens when two objects collide (Newton's Third Law). Collectively, the three laws constitute the basis of classical mechanics — a theory of moving objects.
- Theories are systematic explanations of underlying phenomenon or behavior. Theories are typically based on hypotheses that have been tested and found to be true, but the testing has been incomplete or not rigorous enough to classify the theory as a law. It is important to note that theories are not "wild guesses" but are, instead, the result of experimental observations that found to be true in the instances tested. It is also important to note that theories can be falsified, that is, there are ways to prove that the theory is not true. As examples, the theory of optics explains the properties of light and how it behaves in different media, electromagnetic theory explains the properties of electricity and how to generate it, quantum mechanics explains the properties of subatomic particles, and thermodynamics explains the properties of energy and mechanical work.
- Hypotheses are a well-guessed explanation of some phenomena or a prediction about what will happen in the future. Hypotheses are generally the beginning of an investigation that will either support or reject the hypotheses. As an example, a researcher may hypothesize that products in red boxes sell better than products in blue boxes. To test the hypothesis, an experiment can be set up where the same product is sold in two identical boxes, except that one box is red and the other blue.

The pure science of economics and its applied science of business includes a body of both laws and theories. For example:

- Law of Supply and Demand. While this is often described as a *model* it is also usually categorized as a law since it has been shown to be true in repeated observations. This law basically states that there is a relationship between a product's demand and its supply.
- Law of Diminishing Returns. This law states that at some point increasing a single production factor will yield less profit-per-unit produced. In other words, the return on the investment is not worth the cost.
- The 2009 Nobel Prize for economics was for the theory that groups work together to manage common resources, like water, by using collective property rights.
- The theory of marginalism attempts to explain the discrepancy in the value of goods by looking at their secondary, or marginal, utility. The price of diamonds is greater than water because of a marginal "satisfaction" of owning diamonds when compared to water, even though water is far more utilitarian.

The goal of scientific research is to discover laws and postulate theories that can explain natural or social phenomena, or in other words, build scientific knowledge. It is important to understand that this knowledge may be imperfect or even quite far from the truth. It is important to understand that theories, upon which scientific knowledge is based, are explanations of a particular phenomenon and some tend to fit the observations better than others. The progress of science is marked by progression over time from poorer theories to better theories through enhanced observations using more accurate instruments and more informed logical reasoning.

Scientific laws or theories are derived through a process of logic and evidence. Logic (theory) and evidence (observations) are the two, and only two, pillars upon which scientific knowledge is based. In science, theories and observations are interrelated and one cannot exist without the other. Theories provide meaning and

significance to what we observe and observations help validate or refine existing theory or construct new theory. Any other means of knowledge acquisition, such as faith or authority, cannot be considered science.

1.2.3 Scientific Research

Scientific research moves easily between theory and observations, each reinforcing the other. Theory drives the research of some phenomenon but observations made by the research further refine the underlying theory. Relying solely on observations for making inferences while ignoring theory is not scientific research, it is simple observation. The application of theories and observations lead to two primary types of scientific research: theoretical and empirical. Theoretical research is concerned with developing abstract concepts about natural or social phenomena while empirical research is concerned with testing theoretical concepts to see how well they reflect reality in our observations.

Depending on a researcher's training and interest, scientific inquiry may take one of two forms: *inductive research* or *deductive research*. The goal of inductive research is to infer theoretical concepts and patterns from observed data. In contrast, the goal of deductive research, is to test theory using empirical data. Hence, inductive research is sometimes called theory-building research while deductive research is called theory-testing research. Note here that the goal of theory-testing is not just to test a theory, but to refine, improve, and extend it.

The above figure illustrates the complementary nature of inductive and deductive research; they are two halves of a research cycle that constantly iterates. It is important to understand that theory-building (inductive research) and theory testing (deductive research) are both critical for the advancement of science and they are covered more thoroughly in Chapter 2. Elegant theories are not valuable if they do not match reality. Likewise, mountains of data are also useless until they can contribute to the construction of meaningful theories. Rather than viewing these two processes in a circular relationship, as shown in the above figure, perhaps they can be better viewed as a helix, with each iteration between theory and data contributing to improved observations of the phenomena and the resulting improved theory. Though both inductive and deductive research are important for the advancement of science, it appears that inductive (theory-building) research is more valuable when there are few prior theories or explanations, while deductive (theory-testing) research is more productive when there are many competing theories of the same phenomenon and researchers are interested in knowing which theory works best and under what circumstances.

Theory building and theory testing are particularly difficult in business and marketing, given the imprecise nature of the theoretical concepts and the presence of many unaccounted factors that can influence the phenomenon of interest. It is also very difficult to refute theories that do not work. For instance, Karl Marx's theory of communism as an effective economic engine withstood for decades before it was finally discredited as being inferior to capitalism in promoting growth. Erstwhile communist economies like the Soviet Union and China eventually moved toward more capitalistic economies characterized by profit-maximizing private enterprises. However, the recent collapse of the mortgage and financial industries in the United States demonstrates that capitalism also has its flaws and is not as effective in fostering economic growth and social welfare as previously presumed. Unlike theories in the natural sciences, marketing theories are rarely perfect, which provides numerous opportunities for researchers to improve those theories or build their own alternative theories.

Conducting scientific research, therefore, requires two sets of skills, theoretical and methodological, needed to operate in the theoretical and empirical levels respectively. Methodological skills ("know-how") are relatively standard, invariant across disciplines, and easily acquired through various educational programs. However, theoretical skills ("know-what") is considerably harder to master, requiring years of observation and reflection, and are tacit skills that cannot be taught but rather learned though experience. All of the greatest scientists in the history of humanity, such as Galileo, Newton, and Einstein were master theoreticians, and they are honored for the theories they postulated that transformed the course of science.

1.2.4 Scientific Method

If science is knowledge acquired through a scientific method then what is the *scientific method*? The scientific method refers to a standardized set of techniques for building scientific knowledge, such as how to make valid observations, how to interpret results, and how to generalize those results. The scientific method allows researchers to independently and impartially test preexisting theories and prior findings, and subject them to open debate, modifications, or enhancements. The scientific method must satisfy four characteristics:

- Replicability. Others should be able to independently replicate or repeat a scientific study and obtain similar, if not identical, results.
- Precision. Theoretical concepts, which are often hard to measure, must be defined with such precision that others can use those definitions to measure those concepts and test that theory.
- Falsifiability. A theory must be stated in a way that it can be disproven. Theories that cannot be tested or falsified are not scientific theories and any such knowledge is not scientific knowledge. A theory that is specified in imprecise terms or whose concepts are not accurately measurable cannot be tested, and is therefore not scientific. Sigmund Freud's ideas on psychoanalysis fall into this category and is therefore not considered a "theory" even though psychoanalysis may have practical utility in treating certain types of ailments.
- Parsimony. When there are multiple explanations of a phenomenon, scientists must always accept the simplest or logically most economical explanation. This concept is called parsimony or "Occam's razor." Parsimony prevents scientists from pursuing overly complex or outlandish theories with endless number of concepts and relationships that may explain a little bit of everything but nothing in particular.

Any branch of inquiry that does not allow the scientific method to test its basic laws or theories cannot be called "science." For instance, art is not science because artistic ideas (such as the value of perspective) cannot be tested by independent observers using a replicable, precise, falsifiable, and parsimonious method. Similarly, music, literature, humanities, and law are also not considered science, even though they are creative and worthwhile endeavors.

The scientific method, as applied to business and marketing, includes a variety of research approaches, tools, and techniques, such as qualitative and quantitative data, statistical analysis, experiments, field surveys, case research, and so forth. Most of this book is devoted to learning about these different methods. However, recognize that the scientific method operates primarily at the empirical level of research, i.e., how to make observations and analyze and interpret these observations. Very little of this method is directly pertinent to the theoretical level, which is really the more challenging part of scientific research.

Finally, business researchers must bear in mind that the natural sciences are different from the social sciences in several important respects. The natural sciences are very precise, accurate, deterministic, and independent of the person making the observations. For instance, a scientific experiment in physics, such as measuring the speed of sound through a certain medium, should always yield the same results, irrespective of the time or place of the experiment. However, the same cannot be said for the social sciences, which tend to be less accurate and more ambiguous. For instance, an economist may want to measure the impact of some factor on a city's economy. Unfortunately, the outcome of that research may depend on the background and experience of the researcher, the indexes used to measure the impact, and the interpretation of those measures. In other words, there is a high degree variability in all social science research. While natural scientists agree totally on the speed of light or the gravitational attraction of the earth, there is no agreement among economists on questions like the impact of immigration and how much of a nation's economy should be earmarked for reducing carbon emissions. Researchers in business and marketing must be comfortable with handling high levels of ambiguity, uncertainty, and error that come with research in such sciences.

1.2.5 Types of Science Research

Depending on the purpose of research, scientific research projects can be grouped into three types: exploratory, descriptive, and explanatory.

1.2.5.1 Exploratory

Exploratory research is often conducted in new areas of inquiry, where the goals of the research are:

1. to scope out the magnitude or extent of a particular phenomenon, problem, or behavior
2. to generate some initial ideas (or "hunches") about that phenomenon
3. to test the feasibility of undertaking a more extensive study regarding that phenomenon.

For instance, if the citizens of a country are generally dissatisfied with governmental policies during an economic recession, exploratory research may be directed at measuring the extent of citizens' dissatisfaction. It would consider how the dissatisfaction is manifested and the presumed causes of such dissatisfaction. Such research may include examination of publicly reported figures, such as estimates of economic indicators like gross domestic product (GDP), unemployment, and consumer price index. This research may not lead to a very accurate understanding of the target problem, but may be worthwhile in determining the nature and extent of the problem and serve as a useful precursor to more in-depth research.

1.2.5.2 Descriptive

Descriptive research is directed at making careful observations and detailed documentation of a phenomenon of interest. These observations must be based on the scientific method and therefore, are more reliable than casual observations by untrained people. Examples of descriptive research are tabulation of demographic statistics by the United States Census Bureau who use validated instruments for estimating factors like employment by sector. If any changes are made to the measuring instruments, estimates are provided with and without the changed instrumentation to allow the readers to make a fair before-and-after comparison regarding population or employment trends. Other descriptive research may include projects like chronicling reports of gang activities among adolescent youth, the persistence of religious, cultural, or ethnic practices in select communities, and the role of technologies in the spread of democracy movements.

1.2.5.3 Explanatory

Explanatory research seeks explanations of observed phenomena, problems, or behaviors. While descriptive research examines what, where, and when of a phenomenon, explanatory research seeks answers to why and how. It attempts to "connect the dots" in research, by identifying causal factors and outcomes of the target phenomenon. An example is understanding the reasons behind gang violence with the goal of prescribing strategies to overcome such societal ailments. Most academic or doctoral research belongs to the explanation category, though some amount of exploratory and/or descriptive research may also be needed during initial phases of a research project. Seeking explanations for observed events requires strong theoretical and interpretation skills, along with intuition, insights, and personal experience.

1.2.6 Specific Considerations for Business/Marketing Research

It is important to keep in mind that business researchers attempt to explain patterns in the habits of customers. A pattern does not explain every single person's experience, a fact that is both fascinating and frustrating. Individuals who create a pattern may not be the same over time and may not know one another, but they collectively create a pattern. Those new to business research may find these patterns frustrating because they expect various patterns to describe a group's characteristic but that often does not translate into an actual experience. A pattern can exist among a cohort without a specific individual being 100% true to that pattern.

As an example of patterns and their exceptions, consider the impact of social class on peoples' educational attainment. In fact, Ellwood & Kane [4] found that the percentage of children who did not receive any

[4] Ellwood, David, and Thomas J. Kane. "Who is getting a college education? Family background and the growing gaps in enrollment." Securing the future: Investing in children from birth to college (2000): 283-324.

postsecondary schooling was four times greater among those in the lowest quartile income bracket than those in the upper quartile (that is, children from high-income families were far more likely than low-income children to go to college). These research findings detected patterns in society, but there are certainly many exceptions. Just because a child grows up in a household with little wealth does not keep that child from pursuing a college degree. People who object to research findings tend to cite evidence from their own personal experience, insisting that no patterns actually exists. The problem with this response, however, is that objecting to a social pattern on the grounds that it does not match a specific person's experience misses the point about patterns.

Another matter that social scientists must consider is where they stand on the value of basic as opposed to applied research. In essence, this has to do with questions of for whom and for what purpose research is conducted. We can think of basic and applied research as resting on either end of a continuum. In marketing, basic research studies marketing for marketing's sake — nothing more, nothing less. Sometimes researchers are motivated to conduct research simply because they happen to be interested in a topic and the goal may be to learn more about a topic. Applied research lies at the other end of the continuum. In marketing, applied research studies marketing for some purpose beyond a researcher's interest in a topic. Applied research is often client focused, meaning that the researcher is investigating a question posed by someone other than her or himself.

One final consideration for business and marketing researchers is the difference between qualitative and quantitative methods. Qualitative methods generally involve words (like letters, memos, or policies) or pictures and common methods used include field research, interviews, and focus groups. Quantitative methods, on the other hand, generally involve numbers and common methods include surveys, content analysis, and experimentation. While qualitative methods aim to gain an in-depth understanding of a relatively small number of cases, quantitative methods offer less depth but more breadth because they typically focus on a much larger number of cases.

Sometimes these two methods are presented or discussed in a way that suggests they are somehow in opposition to one another. The qualitative/quantitative debate is fueled by researchers who may prefer one approach over another, either because their own research questions are better suited to one particular approach or because they happened to have been trained in one specific method. While these two methodological approaches differ in goals, strengths, and weaknesses, they both attempt to answer a researcher's question and are equally viable. This text operates from the perspective that qualitative and quantitative methods are complementary rather than competing and both will be covered.

1.3 Summary

1. There are many different sources of knowledge and some are more valuable than others for formulating theories and practices.
2. Science is the discipline of using formalized processes to create theories to explain observed phenomena.
3. Scientific research is a process with a goal of using reproducible methods to create a theory or validate the tenants of an existing theory.
4. Scientific research can be divided into three types: exploratory, descriptive, and expanatory.
5. Business research has specific considerations to meet the sometimes disparate objectives of theory-building and practical application.

Chapter 2

Foundations

2.1 Introduction

This chapter explores the connection between paradigms, theories, and research methods and how the researcher's analytic perspective might shape methodological choices.

2.1.1 Ontology and Epistemology

The principles of business research, like those of sociology and psychology research, are founded on two major branches of philosophy: *ontology* and *epistemology*. Ontology concerns the nature of reality and the researcher's ontological position shapes the sorts of research questions posed and how those questions are researched. Ontology posits two fundamental positions:

Objectivism: Things are real and exist regardless of any sort of social activity. This is often reflected in research about societal organization. Objectivists take the position that people may differ in their perception of reality but there is only one true reality and a researcher's job is to discover that reality.

Constructivism: Things do not just exist apart from the society that observes them. This is often reflected in research about culture and its influence on human activities. Constructivists take the position that reality is shaped individually and that a researcher's job is to understand others' view of reality.

Like ontology, epistemology has to do with knowledge. Rather than dealing with questions about *what is*, epistemology deals with questions of *how we know*.

Four main branches of epistemology are frequently encountered in business research, and the researcher's beliefs concerning these branches will shape the research design.

1. **Pragmatism** accepts both personal experience and measured data as sources of knowledge. These researchers will usually design applied research projects that use different perspectives to help answer a question.

2. **Positivism** relies only on findings gained through measurement. These researchers tend to focus on causality and try to reduce phenomena to its simplest elements.

3. **Realism** relies on observations rather than precise measures to provide credible facts and data. These researchers would use tools like structured interviews to gain an understanding of a phenomenon.

4. **Interpretivism** uses subjective explanations of social phenomena. These researchers use tools like ethnographic studies to attempt to understand an entire social structure.

Burrell and Morgan (1979), in their seminal book *Sociological Paradigms and Organizational Analysis*, suggested that epistemology shapes a researcher's approach to a project, e.g. should an objective or subjective approach be used, while ontology shapes the researcher's interpretation of the findings, e.g. does the world consist mostly of social order or radical change. Using these two sets of assumptions, Burrell and Morgan categorized research as in the figure below.

1. **Functionalism** is the mindset adopted by researchers who…
    - **Ontology**: view the world as orderly and consisting of patterns of ordered events or behaviors.
    - **Epistemology**: believe that the best way to study the world is to use an objective approach that is independent of the person conducting the observation by using standardized collection tools like surveys.
2. **Interpretivism** is the mindset adopted by researchers who…
    - **Ontology**: view the world as orderly and consisting of patterns of ordered events or behaviors.
    - **Epistemology**: believe that the best way to study the world is though the subjective interpretation of participants involved using techniques like interviewing participants and then reconciling differences using their own subjective perspectives.
3. **Radical Structure** is the mindset adopted by researchers who…
    - **Ontology**: view the world as constantly changing, often radically, with few unvarying patterns or behaviors.
    - **Epistemology**: believe that the best way to study the world is to use an objective approach that is independent of the person conducting the observation by using standardized collection tools like surveys.
4. **Radical Humanism** is the mindset adopted by researchers who…
    - **Ontology**: view the world as constantly changing, often radically, with few unvarying patterns or behaviors.
    - **Epistemology**: believe that the best way to study the world is though the subjective interpretation of participants involved using techniques like interviewing participants and then reconciling differences using their own subjective perspectives.

To date, the majority of business research has emulated the natural sciences and adopted functionalist techniques. Thus, researchers tend to believe that social patterns can be understood in terms of their functional components so they study those components in detail using objective techniques like surveys and experimental research. However, a small but growing number of researchers are adopting interpretivist techniques and are attempting to understand social order using subjective tools such as interviews and ethnographic studies. Radical structuralism and radical humanism represents a negligible proportion of business research because researchers are primarily concerned with understanding generalizable patterns of behavior rather than idiosyncratic or changing events. However, social and organizational phenomena generally consists of elements of both order and change. For instance, organizational success depends on formalized business processes, work procedures, and job responsibilities, while being simultaneously constrained by a constantly changing mix of competitors, competing products, suppliers, and customer base in the business environment. Therefore, to obtain a holistic understanding of phenomena like the success of some businesses and failure of others may require a multi-modal approach.

2.2 Paradigms and Theories

The terms *paradigm* and *theory* are often used interchangeably in business and marketing research although experts disagree about whether these are identical or distinct concepts. This text makes a slight distinc-

tion between the two ideas because thinking about each concept as analytically distinct provides a useful framework for understanding the connections between research methods and scientific ways of thinking.

2.2.1 Paradigm

The researcher's own frames of reference, or believe systems, form a paradigm. Thus, if a researcher is, generally, functionalist in outlook then that would be the paradigm used to design and conduct research projects. Paradigms are usually quite complex and include facets of upbringing, family influence, societal norms, and many other factors. Paradigms are often hard to recognize, because they are implicit, assumed, and taken for granted. However, recognizing paradigms is key to making sense of and reconciling differences in peoples' perceptions of the same social phenomenon. For instance, why do liberals believe that the best way to improve secondary education is to hire more teachers, but conservatives believe that privatizing education (using such means as school vouchers) are more effective in achieving the same goal? The differences in two paradigms explains this conflict, liberals believe more in labor (i.e., in having more teachers and schools) while conservatives place more faith in competitive markets (i.e., in free competition between schools competing for education dollars).

Paradigms are like "colored glasses" that govern how people structure their thoughts about the world. As one other example, imagine that a certain technology was successfully implemented in one organization but failed miserably in another. A researcher using a "rational lens" will look for rational explanations of the problem such as inadequate technology or poor fit between technology and the task context where it is being utilized. Another research looking at the same problem through a "social lens" may seek out social deficiencies such as inadequate user training or lack of management support. Yet another researcher seeing it through a "political lens" will look for instances of organizational politics that may subvert the technology implementation process. Hence, subconscious paradigms often constrain the concepts that researchers attempt to measure and their subsequent interpretations of those measures. However, it is likely that all of the above paradigms are at least partially correct and a fuller understanding of the problem may require an application of multiple paradigms.

Two paradigms are commonly found in business research.

1. Positivism. This is the framework that usually comes to mind when people think about scientific research [1]. Positivism is guided by the principles of objectivity, knowability, and deductive logic The positivist framework operates from the assumption that society can and should be studied empirically and scientifically. Positivism also calls for value-free research where researchers attempt to abandon their own biases and values in a quest for objective, empirical, and knowable truth. Positivism is based on the works of French philosopher Auguste Comte (1798 - 1857) and was the dominant scientific paradigm until the mid-20th century. Unfortunately, positivism eventually evolved to empiricism or a blind faith in observed data and a rejection of any attempt to extend or reason beyond observable facts. Since human thoughts and emotions could not be directly measured, there were not considered to be legitimate topics for scientific research.

2. Postmodernism. Frustrations with the strictly empirical nature of positivist philosophy led to the development of postmodernism during the mid-late 20th century. Postmodernism argues that one can make reasonable inferences about a phenomenon by combining empirical observations with logical reasoning. Postmodernists view science as not certain but probabilistic (i.e., based on many contingencies), and often seek to explore these contingencies to understand social reality better. The postmodernist camp has further fragmented into subjectivists, who view the world as a subjective construction of our minds rather than as an objective reality, and critical realists, who believe that there is an external reality that is independent of a person's thinking but we can never know such reality with any degree of certainty.

[1] Positivism was also discussed as one of the main branches of epistemology but since it is so common in the research community it is also recognized as a paradigm.

2.2.2 Theory

2.2.2.1 Definition

Theories are explanations of a natural or social behavior, event, or phenomenon. More formally, a scientific theory is a system of constructs (concepts) and propositions (relationships between those constructs) that collectively presents a logical, systematic, and coherent explanation of a phenomenon of interest within some assumptions and boundary conditions [2] It is important to note that people not familiar with scientific research often view a theory as some sort of speculation, a "guess," and statements like "it's only a theory" are common. However, a scientific theory is well-researched and based on repeated observations of some phenomenon. As an example, plate tectonics is a theory which indicates that the continents are slowly moving across the earth's surface. This is a well-established theory based on research spanning decades of observations, not just some sort of idle speculation. A good scientific theory should be well supported using observed facts and also have practical value. Famous organizational research Kurt Lewin once said, "Theory without practice is sterile; practice without theory is blind." Hence, both theory and practice are essential elements of research.

Theories should explain *why* things happen rather than just describe or predict. Note that it is possible to predict events or behaviors using a set of predictors without necessarily explaining why such events are taking place. For instance, market analysts predict fluctuations in the stock market based on market announcements, earnings reports of major companies, and new data from the Federal Reserve and other agencies, based on previously observed correlations. Prediction requires only correlations while explanations require causations. Establishing causation requires three conditions:

1. Correlations between two constructs
2. Temporal precedence (the cause must precede the effect in time)
3. Rejection of alternative hypotheses (through testing)

It is also important to understand what theory is not. Theory is not data, facts, typologies, taxonomies, or empirical findings. A collection of facts is not a theory, just as a pile of stones is not a house. Likewise, a collection of constructs (e.g., a typology of constructs) is not a theory, because theories must go well beyond constructs to include propositions, explanations, and boundary conditions. Data, facts, and findings operate at the empirical or observational level, while theories operate at a conceptual level and are based on logic rather than observations.

There are many benefits to using theories in research. First, theories provide the underlying logic explaining the occurrence of phenomena by describing the key drivers, outcomes, and underlying processes that are responsible for that phenomenon. Second, theories aid in sense-making by synthesizing prior findings within a framework. Third, theories provide guidance for future research by helping identify constructs and relationships that are worthy of further research. Fourth, theories contribute to the cumulative body of knowledge and bridge gaps between other theories by reevaluating those theories in a new light.

However, theories can also have their own share of limitations. As simplified explanations of reality, theories may not always provide adequate explanations of the phenomena of interest. Theories are designed to be simple and parsimonious explanations, while reality is usually significantly more complex. Furthermore, theories may impose blinders or limit researchers' "range of vision," causing them to miss out on important concepts that are not defined by the theory.

2.2.2.2 Building Blocks of a Theory

David Whetten [3] suggests that there are four building blocks of a theory:

[2] Bacharach, Samuel B. "Organizational theories: Some criteria for evaluation." Academy of management review 14.4 (1989): 496-515.

[3] Whetten, David A. "What constitutes a theoretical contribution?."" Academy of management review 14.4 (1989): 490-495.

1. Constructs capture the "what"" of theories (i.e., what concepts are important for explaining a phenomenon). They are abstract concepts specified at a high level of abstraction that are chosen specifically to explain the phenomenon of interest. Constructs may be unidimensional (i.e., embody a single concept), such as weight or age, or multi-dimensional (i.e., embody multiple underlying concepts), such as personality or culture. While some constructs, such as age, education, and firm size, are easy to understand, others, such as creativity, prejudice, and organizational agility, may be more complex and abstruse, and still others such as trust, attitude, and learning, may represent temporal tendencies rather than steady states. Nevertheless, all constructs must have clear and unambiguous operational definition that should specify exactly how the construct will be measured and at what level of analysis (individual, group, organizational, etc.). Measurable representations of abstract constructs are called variables. For instance, intelligence quotient (IQ score) is a variable that is purported to measure an abstract construct called intelligence. As noted earlier, scientific research proceeds along two planes: a theoretical plane and an empirical plane. Constructs are conceptualized at the theoretical plane, while variables are operationalized and measured at the empirical (observational) plane. Furthermore, variables may be independent, dependent, mediating, or moderating. The distinction between constructs (conceptualized at the theoretical level) and variables (measured at the empirical level) is shown in the following figure.

2. Propositions capture the "how" (i.e., how are these concepts related to each other). They are associations postulated between constructs based on deductive logic. Propositions are stated in declarative form and should ideally indicate a cause-effect relationship (e.g., if X occurs, then Y will follow). Note that propositions may be conjectural but *must* be testable, and should be rejected if they are not supported by empirical observations. However, like constructs, propositions are stated at the theoretical level, and they can only be tested by examining the corresponding relationship between measurable variables of those constructs. The empirical formulation of propositions, stated as relationships between variables, is called hypotheses. The distinction between propositions (formulated at the theoretical level) and hypotheses (tested at the empirical level) is depicted in the following figure.

3. Logic represents the "why" (i.e., why are these concepts related). Logic provides the basis for justifying the propositions as postulated. Logic acts like a "glue" that connects the theoretical constructs and provides meaning and relevance to the relationships between these constructs. Logic also represents the "explanation" that lies at the core of a theory. Without logic, propositions will be ad hoc, arbitrary, and meaningless, and cannot be tied into a cohesive "system of propositions" that is the heart of any theory.

4. Boundary Conditions/Assumptions examines the "who, when, and where" (i.e., under what circumstances will these concepts and relationships work). All theories are constrained by assumptions about values, time, and space, and boundary conditions that govern where the theory can be applied and where it cannot be applied. For example, many economic theories assume that human beings are rational (or boundedly rational) and employ utility maximization based on cost and benefit expectations as a way of understand human behavior. In contrast, political science theories assume that people are more political than rational, and try to position themselves in their professional or personal environment in a way that maximizes their power and control over others. Given the nature of their underlying assumptions, economic and political theories are not directly comparable, and researchers should not use economic theories if their objective is to understand the power structure or its evolution in a organization. Likewise, theories may have implicit cultural assumptions (e.g., whether they apply to individualistic or collective cultures), temporal assumptions (e.g., whether they apply to early stages or later stages of human behavior), and spatial assumptions (e.g., whether they apply to certain localities but not to others). If a theory is to be properly used or tested, all of its implicit assumptions that form the boundaries of that theory must be properly understood. Unfortunately, theorists rarely state their implicit assumptions clearly, which leads to frequent misapplications of theories to problem situations in research.

2.2.2.3 Variables

A term frequently associated with, and sometimes used interchangeably with, a construct is a variable. Etymologically speaking, a variable is a quantity that can vary (e.g., from low to high, negative to positive, etc.), in contrast to constants that do not vary (i.e., remain constant). However, in scientific research, a variable is a measurable representation of an abstract construct. As abstract entities, constructs are not directly measurable, and hence, we look for proxy measures called variables. For instance, a person's intelligence is often measured as his or her IQ (intelligence quotient) score, which is an index generated from an analytical and pattern-matching test administered to people. In this case, intelligence is a construct (a concept), and the IQ score is a variable that measures that construct. Whether IQ scores truly measures one's intelligence is anyone's guess (though many believe that they do), and depending on whether how well it measures intelligence, the IQ score may be a good or a poor measure of the intelligence construct.

Depending on their intended use, variables may be classified as

- Independent. Explain other variables.
- Dependent. Are explained by other variables.
- Moderating. Influence the relationship between independent and dependent variables.
- Mediating. Are explained by independent variables while also explain dependent variables.
- Control. Variables that are not pertinent to explaining a dependent variable so must be controlled.

To understand the differences between these different variable types, consider the example shown in the following figure.

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If the researcher believes that intelligence influences students' academic achievement, then a measure of intelligence such as an IQ score would be the independent variable while a measure of academic success, grade point average, would be the dependent variable. If it is father believed that the effect of intelligence on academic achievement is also dependent on the students' effort then "effort" becomes a moderating variable. Incidentally, it would be reasonable to also view effort as the independent variable and intelligence as a moderating variable.

2.2.2.4 Attributes of a Good Theory

Theories are simplified and often partial explanations of complex social reality. As such, there can be good explanations or poor explanations, and consequently, there can be good theories or poor theories. How can we evaluate the "goodness" of a given theory? Different criteria have been proposed by different researchers, the more important of which are listed below:

1. Logical consistency: Are the theoretical constructs, propositions, boundary conditions, and assumptions logically consistent with each other? If some of these "building blocks" of a theory are inconsistent with each other (e.g., a theory assumes rationality, but some constructs represent non-rational concepts), then the theory is a poor theory.

2. Explanatory power: How much does a given theory explain (or predict) reality? Good theories obviously explain the target phenomenon better than rival theories, as often measured by variance explained (R-square) value in regression equations.

3. Falsifiability: British philosopher Karl Popper stated in the 1940's that for theories to be valid, they must be falsifiable. Falsifiability ensures that the theory is potentially disprovable, if empirical data does not match with theoretical propositions, which allows for their empirical testing by researchers. In other words, theories cannot be theories unless they can be empirically testable. Tautological statements, such as "a day with high temperatures is a hot day" are not empirically testable because a hot day is defined (and measured) as a day with high temperatures, and hence, such statements cannot be viewed as a theoretical proposition. Falsifiability requires presence of rival explanations it ensures that the constructs are adequately measurable, and so forth. However, note that saying that a theory

is falsifiable is not the same as saying that a theory should be falsified. If a theory is indeed falsified based on empirical evidence, then it was probably a poor theory to begin with!

4. Parsimony: Parsimony examines how much of a phenomenon is explained with how few variables. The concept is attributed to 14th century English logician Father William of Ockham (and hence called "Ockham's razor" or "Occam's razor"), which states that among competing explanations that sufficiently explain the observed evidence, the simplest theory (i.e., one that uses the smallest number of variables or makes the fewest assumptions) is the best. Explanation of a complex social phenomenon can always be increased by adding more and more constructs. However, such approach defeats the purpose of having a theory, which are intended to be "simplified" and generalizable explanations of reality. Parsimony relates to the degrees of freedom in a given theory. parsimonious theories have higher degrees of freedom, which allow them to be more easily generalized to other contexts, settings, and populations.

2.2.2.5 Approaches to Theorizing

How do researchers build theories? Steinfeld and Fulk [4] recommend four such approaches. The first approach is to build theories inductively based on observed patterns of events or behaviors. Such approach is often called "grounded theory building," because the theory is grounded in empirical observations. This technique is heavily dependent on the observational and interpretive abilities of the researcher, and the resulting theory may be subjective and non-confirmable. Furthermore, observing certain patterns of events will not necessarily make a theory, unless the researcher is able to provide consistent explanations for the observed patterns.

The second approach to theory building is to conduct a bottom-up conceptual analysis to identify different sets of predictors relevant to the phenomenon of interest using a predefined framework. One such framework may be a simple input-process-output framework, where the researcher may look for different categories of inputs, such as individual, organizational, and/or technological factors potentially related to the phenomenon of interest (the output), and describe the underlying processes that link these factors to the target phenomenon. This is also an inductive approach that relies heavily on the inductive abilities of the researcher, and interpretation may be biased by researcher's prior knowledge of the phenomenon being studied.

The third approach to theorizing is to extend or modify existing theories to explain a new context, such as by extending theories of individual learning to explain organizational learning. While making such an extension, certain concepts, propositions, and/or boundary conditions of the old theory may be retained and others modified to fit the new context. This deductive approach leverages the rich inventory of social science theories developed by prior theoreticians, and is an efficient way of building new theories by building on existing ones.

The fourth approach is to apply existing theories in entirely new contexts by drawing upon the structural similarities between the two contexts. This approach relies on reasoning by analogy, and is probably the most creative way of theorizing using a deductive approach. For instance, Markus [5] used analogic similarities between a nuclear explosion and uncontrolled growth of networks or network-based businesses to propose a critical mass theory of network growth. Just as a nuclear explosion requires a critical mass of radioactive material to sustain a nuclear explosion, Markus suggested that a network requires a critical mass of users to sustain its growth, and without such critical mass, users may leave the network, causing an eventual demise of the network.

[4] Steinfield, Charles W., and Janet Fulk. "The theory imperative." Organizations and communication technology (1990): 13-25.

[5] Markus, M. Lynne. "Toward a 'critical mass' theory of interactive media: Universal access, interdependence and diffusion." Communication research 14.5 (1987): 491-511.

2.3 Propositions, Hypothesis, and Models

In seeking explanations to an observed phenomenon it is not adequate just to identify key constructs underlying that phenomenon, it is important to also state the patterns of the relationships between constructs. Such patterns of relationships are called propositions. A proposition, thus, is a conjectural relationship between constructs that is stated in a declarative form. An example of a proposition is: "An increase in student intelligence leads to an increase in academic achievement." A proposition does not need to be true but it must be testable so its truth can be determined. Propositions are generally derived from either logic (deduction) or observation (induction).

Because propositions are associations between abstract constructs, they cannot be tested directly. Instead, they are tested indirectly by examining the relationship between the corresponding measures (variables) of those constructs. The formulation of a proposition is called a hypotheses. Since IQ scores and grade point average are operational measures of intelligence and academic achievement respectively, the proposition stated above can be specified in form of a hypothesis: "An increase in students' IQ score leads to an increase in their grade point average." Propositions are generated from theory while hypotheses are generated from empirical evidence. Hence, hypotheses are testable using observed data and may be rejected if the data do not support them.

Hypotheses are said to be either strong or weak. "Students' IQ scores are related to their academic achievement" is an example of a weak hypothesis since it indicates neither the directionality of the hypothesis (i.e., whether the relationship is positive or negative) nor its causality (i.e., whether intelligence causes academic achievement or academic achievement causes intelligence). A stronger hypothesis is "students' IQ scores are positively related to their academic achievement," which indicates the directionality but not the causality. A still better hypothesis is "students' IQ scores have positive effects on their academic achievement," which specifies both the directionality and the causality (i.e., intelligence causes academic achievement, and not the reverse).

Also note that hypotheses should clearly specify independent and dependent variables. In the hypothesis, "students' IQ scores have positive effects on their academic achievement," it is clear that IQ scores are the independent variable (the "cause") and academic achievement is the dependent variable (the "effect"). Further, it is also clear that this hypothesis can be evaluated as either true (if higher intelligence leads to higher academic achievement) or false (if higher intelligence has no effect on or leads to lower academic achievement). Statements such as "students are generally intelligent" or "all students can achieve academic success" are not hypotheses because they do not specify independent and dependent variables nor do they specify a directional relationship that can be evaluated as true or false.

2.3.1 Theories and Models

A term often used in conjunction with theory is "model." A model is a representation of all or part of a system that is constructed to study that system (e.g., how the system works or what triggers the system). While a theory tries to explain a phenomenon, a model tries to represent a phenomenon in an understandable way. Models are often used to make important decisions that are based on a given set of inputs. For instance, marketing managers may use models to decide how much money to spend on advertising for different product lines based on parameters such as prior year's advertising expenses, sales, market growth, and competing products. Likewise, weather forecasters use models to predict future weather patterns based on parameters such as wind speeds, wind direction, temperature, and humidity. While these models are useful, they do not explain the theory behind advertising budgets or weather forecasting.

Models may be of different kinds, such as mathematical models, network models, and path models. Models can also be descriptive, predictive, or normative. Descriptive models are frequently used for representing complex systems, for visualizing variables and relationships in such systems. Predictive models (e.g., a regression model) allow forecast of future events. Normative models are used to guide activities along commonly accepted norms or practices. Models may also be static if it represents the state of a system at one point in time or dynamic if it represents a system's evolution over time.

The process of theory or model development may involve both inductive and deductive reasoning, as described in Chapter 1 and shown in the following figure. Induction occurs when we observe a fact and ask, "Why is this happening?" while deduction occurs when we have a theory and ask, "Is this supported by observable facts?" Both induction and deduction leads to preliminary conclusions that are then tested in order to develop a final model of the phenomenon. Researchers must be able to move back and forth between inductive and deductive reasoning if they are to post extensions or modifications to a given model or theory, or built better ones, which are the essence of scientific research.

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2.4 Inductive or Deductive Approaches

Theories are used to structure research at the same time that the research structures theory. The reciprocal relationship between theory and research becomes more evident to researchers as they determine whether an inductive or deductive approach is best. Often, researchers find that a single approach is not ideal and projects iterate over many cycles of inductive/deductive approaches. It is common for a researcher to start with an inductive approach and postulate a new theory then switch to a deductive approach to test that theory. Later the researcher may return to an inductive approach to expand and refine the theory, followed by another round of deductive methods to test the new theory.

2.4.1 Inductive Approaches

In an inductive approach to research, a researcher begins by collecting data that are relevant to the topic of interest. Once a substantial amount of data have been collected, the researcher will start to look for trends or correlations and then develop the theory that explains those patterns. Thus, an inductive approach moves from data to theory, or from specific instances to general explanations and is often referred to as a "bottom-up" approach. The following figure broadly outlines the process used with an inductive approach to research.

Inductive methods are commonly applied to qualitative research projects and are frequently criticized for being too subjective. The goal is, generally, to attempt to understand the dynamics of business practices and use that understanding to draw general conclusions that may apply to other businesses. The result of many qualitative research projects is what is called *Grounded Theory* [6] where the researcher starts with no preconceived notions and generates a new theory from the data analysis.

Following are three examples of inductive methods research.

1. Bansal, Pratima, and Roth [7] conducted a study concerning why corporations "go green." They collected data from 53 firms in the United Kingdom and Japan and analyzed that data to formulate a theory.
2. Sharma [8] sent surveys to 3-5 senior managers of 110 Canadian oil and gas companies with annual sales in excess of $20M. The surveys were analyzed and the researcher concludes that managers of these companies must be influenced to embrace environmental issues as a corporate goal, but that must be done within the context of the corporate structure.
3. Sia and Gopa [9] used an inductive method to analyze effect on diversity of the "psychological contract" between a corporation and its employees. A psychological contract is described as what the employee

[6] Grounded theory was first discussed by Glaser and Strauss in the late 1960's but has been discussed in many journal articles and books. See, for example, Strauss, Anselm, and Juliet Corbin. "Grounded theory methodology." Handbook of qualitative research 17 (1994): 273-85.

[7] Bansal, Pratima, and Kendall Roth. "Why companies go green: A model of ecological responsiveness." Academy of management journal 43.4 (2000): 717-736.

[8] Sharma, Sanjay. "Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy." Academy of Management journal 43.4 (2000): 681-697.

[9] Sia, Surendra Kumar, and Gopa Bhardwaj. "Employees 'perception of diversity climate: Role of psychological contract." Journal of Indian Academy of Applied Psychology 35 (2009): 305-312.

"…believes he or she has agreed to…" rather than what is actually in the employment contract. They administered two different surveys to 207 managers of public sector units in Orrisa, India. They found that certain minority groups tended to "…protect each other when required, particularly during the time of crisis." However, members of the dominant group did not engage in that type of behavior, leading to "…a feeling of non-inclusiveness."

In addition to the research studies discussed above, several papers have been recently published by various journals encouraging inductive research methods, especially in analyzing case studies. For example, Eisenhardt and Graebner [10] published an article in the *Academy of Management Journal* that suggested a process for generating theory from multiple case studies and encouraged management researchers to consider the role of theory-generation in their case studies.

2.4.2 Deductive Approaches

In a deductive approach to research, a researcher begins with a theory of interest and then collects data to test that theory. Thus, a deductive approach moves from a general explanation of some phenomenon to specific instances that prove, or disprove, the phenomenon and is often referred to as a "top-down" approach. The following figure broadly outlines the process used with a deductive approach to research.

Deductive methods are commonly applied to quantitative research projects and are often considered the "gold standard" of methods, especially among researchers in the natural sciences. The goal is, generally, to test existing theories to see if they are valid in cases that have not been previously considered. Following are a few example studies that use a deductive approach.

1. Parboteeah, Paik, and Cullen [11] studied the influence of religion on the workplace. They used data from more then 44 thousand individuals in 39 countries to determine if Buddhism, Christianity, Hindusim, and Islam influenced both extrinsic and intrinsic work values. They found that the results "…generally support the posited hypotheses, confirming that religion is positively related to work values." Because the study began with hypotheses and tested those hypotheses against gathered data this is a deductive methodology.

2. Hackman and Oldham [12] used existing theory to develop a model to predict the conditions that will motivate employees to perform effectively on their jobs. They tested 658 employees who worked at 62 different jobs in seven organizations and found that the results support the validity of their model.

3. Delaney and Huselid [13] investigated the relationship between human resource management and perceptions of organizational performance. They came up with two hypotheses and then gathered data to test those hypotheses. The result of their study is that positive human resources practices (like training programs) have a positive correlation with the perception of the organizational performance.

2.4.3 Complementary Approaches

While inductive and deductive approaches to research seem quite different, they are complementary in the sense that one approach creates theories and the other tests theories. In some cases, researchers plan for their research to include multiple phases, one inductive and the other deductive. In other cases, a researcher might begin a study with the plan to only conduct either inductive or deductive research but then discover that the other approach is needed to develop a full picture.

[10] Eisenhardt, Kathleen M., and Melissa E. Graebner. "Theory building from cases: Opportunities and challenges." Academy of management journal 50.1 (2007): 25-32.

[11] Parboteeah, K. Praveen, Yongsun Paik, and John B. Cullen. "Religious groups and work values: A focus on Buddhism, Christianity, Hinduism, and Islam." International Journal of Cross Cultural Management 9.1 (2009): 51-67.

[12] Hackman, J. Richard, and Greg R. Oldham. "Motivation through the design of work: Test of a theory." Organizational behavior and human performance 16.2 (1976): 250-279.

[13] Delaney, John T., and Mark A. Huselid. "The impact of human resource management practices on perceptions of organizational performance." Academy of Management journal 39.4 (1996): 949-969.

One such example is a research project completed by Lawrence Sherman and Richard Berk [14]. They conducted an experiment to test two competing theories of the effects of punishment on deterring domestic violence. Specifically, Sherman and Berk hypothesized that deterrence theory would provide a better explanation of the effects of arresting accused batterers than labeling theory. Deterrence theory predicts that arresting an accused spouse batterer will reduce future incidents of violence while labeling theory predicts that arresting accused spouse batterers will increase future incidents.

Sherman and Berk found, after conducting an experiment with the help of local police in one city, that arrest did in fact deter future incidents of violence, thus supporting their hypothesis that deterrence theory would better predict the effect of arrest. After conducting this research, they and other researchers went on to conduct similar experiments in six additional cities but the results from these follow-up studies were mixed. In some cases, arrest deterred future incidents of violence but in other cases, it did not. This left the researchers with new data that they needed to explain. The researchers next took an inductive approach in an effort to make sense of their latest empirical observations. The new studies revealed that arrest seemed to have a deterrent effect for those who were married and employed but that it led to increased offenses for those who were unmarried and unemployed. In the end, the researchers turned to control theory and predicted that having some stake in conformity through the social ties provided by marriage and employment would deter future violence.

2.5 Qualitative vs. Quantitative Data

2.6 Summary

Theories, paradigms, levels of analysis, and the order in which one proceeds in the research process all play an important role in shaping what we ask about the business, how we ask it, and in some cases, even what we are likely to find. A microlevel study of employment practices will look much different than a macrolevel study. A researcher's theoretical perspective will also shape a study. In particular, the theory invoked will likely shape not only the way a question about a topic is asked but also which topic gets investigated in the first place.

This does not mean that business research is biased or corrupt. One of the main preoccupations of researchers is to recognize and address the biases that creep into the research process. It is human nature to prefer a particular approach to a research project but understanding the strengths and weaknesses of that approach is crucial for not only successfully completing a research-based investigation but also for intelligently reading and understanding research reports.

[14] Sherman, Lawrence W., and Richard A. Berk. "The specific deterrent effects of arrest for domestic assault." American sociological review (1984): 261-272.

Chapter 3

Methods

We describe our methods in this chapter.

Chapter 4

Applications

Some *significant* applications are demonstrated in this chapter.

4.1 Example one

4.2 Example two

Chapter 5

Final Words

We have finished a nice book.