BUSINESS RESEARCH METHODS

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ZIKMUND

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Custom Contents

1

THEORY BUILDING

What you will learn in this chapter

- To understand the goals of theory.
- To define the meaning of *theory*.
- To understand the terms *concept*, *proposition*, *variable*, and *hypothesis*.
- To understand that because concepts abstract reality, it is possible to discuss concepts at various levels of abstraction.
- To understand the scientific method.
- To discuss how theories are generated.

The purpose of science concerns the expansion of knowledge and the discovery of truth. Theory building is the means by which basic researchers hope to achieve this purpose. ■

WHAT ARE THE GOALS OF THEORY?

A scientist investigating business phenomena wants to know what produces inflation. Another person wants to know if organizational structure influences leadership style. Both want to be able to predict behavior, to be able to say that if we do such and such, then so and so will happen.[1]

Prediction and understanding are the two purposes of theory.[2] Accomplishing the first goal allows the theorist to predict the behavior or characteristics of one phenomenon from the knowledge of another phenomenon's characteristics. A business researcher may theorize that older investors tend to be more interested in investment income than younger investors. This theory, once verified, should allow researchers to predict the importance of expected dividend yield on the basis of investors' ages. The ability to anticipate future conditions in the environment or in an organization may be extremely valuable, yet prediction alone may not satisfy the scientific researcher's goals. Successfully forecasting an election outcome does not satisfy one's curiosity about the reason *why* a candidate won the election. A researcher also wants to gain understanding. In most situations, of course, prediction and understanding go hand in hand. To predict phenomena, we must have an explanation of why variables behave as they do. Theories provide these explanations.

TO THE POINT

Theories are nets cast to catch what we call "the world": to rationalize, to explain, and to master it. We endeavour to make the mesh ever finer and finer.

—KARL R. POPPER, THE LOGIC OF SCIENTIFIC DISCOVERY

THE MEANING OF THEORY

> Like all abstractions, the word "theory" has been used in many different ways, in many different contexts, at times so broadly as to include almost all descriptive statements about a class of phenomena, and at other times so narrowly as to exclude everything but a series of terms and their relationships that satisfies certain logical requirements.[3]

theory
A coherent set of general propositions used to explain the apparent relationships among certain observed phenomena. Theories allow generalizations beyond individual facts or situations.

For our purposes, a **theory** is a coherent set of general propositions, used as principles of explanation of the apparent relationships of certain observed phenomena. A key element in our definition is the term *proposition*. Before we can see what a proposition is, however, we must discuss the nature of *theoretical concepts*.

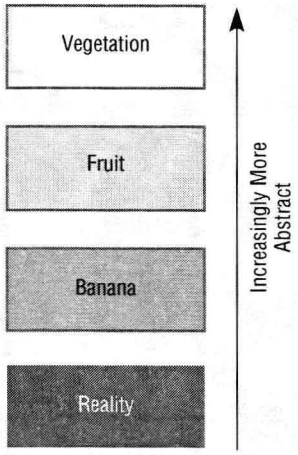
CONCEPTS

concept
A generalized idea about a class of objects; an abstraction of reality that is the basic unit for theory development.

Theory development is essentially a process of describing phenomena at increasingly higher levels of abstraction. Things that we observe can be described as concepts. A **concept** (or construct) is a generalized idea about a class of objects, attributes, occurrences, or processes that has been given a name. If you, as an organizational theorist, were to describe phenomena such as supervisory behavior, you would categorize empirical events or real things into concepts. Concepts are building blocks, and in organizational theory, "leadership," "productivity," and "morale" are concepts. In the theory of finance, "gross national product," "asset," and "inflation" are frequently used concepts.

Concepts abstract reality. That is, concepts are expressed in words that refer to various events or objects. For example, the concept "asset" is an abstract term that may, in the concrete world of reality, refer to a specific punch press machine. Concepts, however, may vary in degree of abstraction. The abstraction

EXHIBIT 3.1 A LADDER OF ABSTRACTION FOR CONCEPTS



ladder of abstraction
Organization of concepts in sequence from the most concrete and individual to the most general.

abstract level
In theory development, the level of knowledge expressing a concept that exists only as an idea or a quality apart from an object.

empirical level
Level of knowledge that is verifiable by experience or observation.

ladder in Exhibit 3.1 indicates that it is possible to discuss concepts at various levels of abstraction. Moving up the **ladder of abstraction**, the basic concept becomes more abstract, wider in scope, and less amenable to measurement. The basic or scientific business researcher operates at two levels: on the **abstract level** of concepts (and propositions) and on the empirical level of variables (and hypotheses). At the **empirical level**, we "experience" reality—that is, we observe or manipulate objects or events (see Exhibit 3.2).[4]

If the organizational researcher says "Older workers prefer different rewards than younger workers," two concepts—age of worker and reward preference—are the subjects of this abstract statement. If the researcher wishes to test this hypothesis, John, age 19, Chuck, age 45, and Mary, age 62—along with other workers—may be questioned about their preferences for salary, retirement plans, intrinsic job satisfaction, and the like. Recording their ages and observing their stated preferences are activities that occur at the empirical level.

Researchers are concerned with the observable world, or what we shall loosely term "reality." Theorists translate their conceptualization of reality into

EXHIBIT 3.2 CONCEPTS ARE ABSTRACTIONS OF REALITY

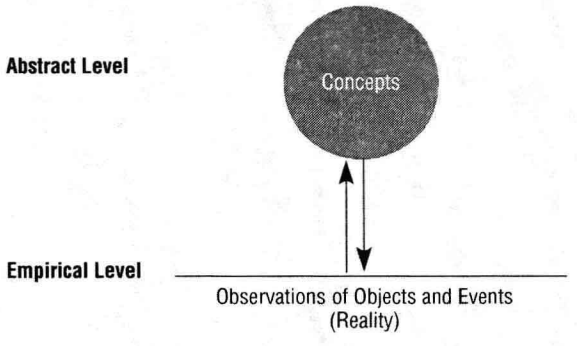
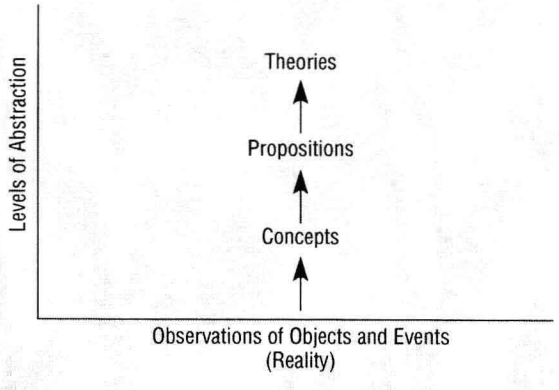


EXHIBIT 3.3 THEORY BUILDING IS A PROCESS OF INCREASING ABSTRACTION



TO THE POINT

Reality is merely an illusion, albeit a very persistent one.

ALBERT EINSTEIN

abstract ideas. Thus, theory deals with abstraction. Things are not the essence of theory; ideas are.[5] Concepts in isolation are not theories. Only when we explain how concepts relate to other concepts do we begin to construct theories.

NATURE OF PROPOSITIONS

proposition
A statement concerned with the relationships among concepts; an assertion of a universal connection between events that have certain properties.

Concepts are the basic units of theory development. However, theories require an understanding of the relationship among concepts. Thus, once reality is abstracted into concepts, the scientist is interested in the relationship among various concepts. **Propositions** are statements concerned with the relationships among concepts. A proposition explains the *logical* linkage among certain concepts by asserting a universal connection between concepts. A proposition states that every concept about an event or thing either has a certain property or stands in a certain relationship to other concepts about the event or thing.[6]

Consider the following behavioral science proposition that permeates many business theories: If reinforcements follow each other at evenly distributed intervals, and everything else is held constant, the resulting habit will increase in strength as a positive growth function of the number of trials.[7] This proposition identifies theoretical relationships between the concepts "reinforcements" and "habit." It identifies the direction and magnitude of these relationships.

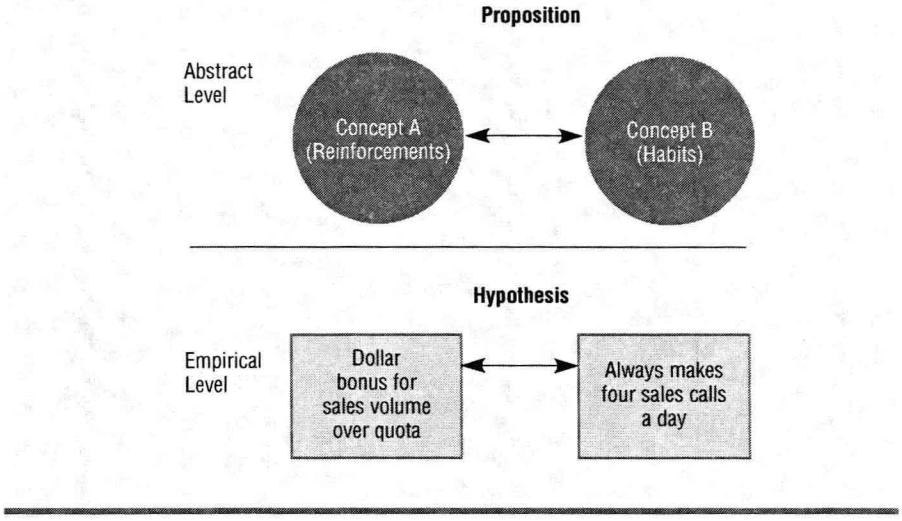
We have indicated that a theory is an abstraction from observed reality. Concepts are at one level of abstraction (see Exhibit 3.3). Investigating propositions requires that we increase our level of abstract thinking. When we think about theories, we are at the highest level of abstraction because we are investigating the relationship between propositions. Theories are networks of propositions.

THE SCIENTIFIC METHOD

scientific method
Techniques or procedures used to analyze empirical evidence in an attempt to confirm or disprove prior conceptions.

The **scientific method** is a set of prescribed procedures for establishing and connecting theoretical statements about events, for analyzing empirical evidence, and for predicting events yet unknown. There is no consensus concerning exact procedures for the scientific method, but most discussions of the scientific method include references to "empirical testability." *Empirical* means verifiable

EXHIBIT 3.4 | HYPOTHESES ARE THE EMPIRICAL COUNTERPARTS OF PROPOSITIONS



by observation, experimentation, or experience. The process of empirical verification cannot be divorced from the process of theory development.

hypothesis
An unproven proposition or supposition that tentatively explains certain facts or phenomena; a proposition that is empirically testable.

A **hypothesis** is a proposition that is empirically testable. It is an empirical statement concerned with the relationship among variables. The abstract proposition "Reinforcements will increase habit strength" may be tested empirically with a hypothesis. Exhibit 3.4 shows that the hypothesis "Bonus pay given for sales volume consistently above quota will be associated with the number of sales calls a day" is an empirical counterpart of the proposition.

variable
Anything that may assume different numerical values.

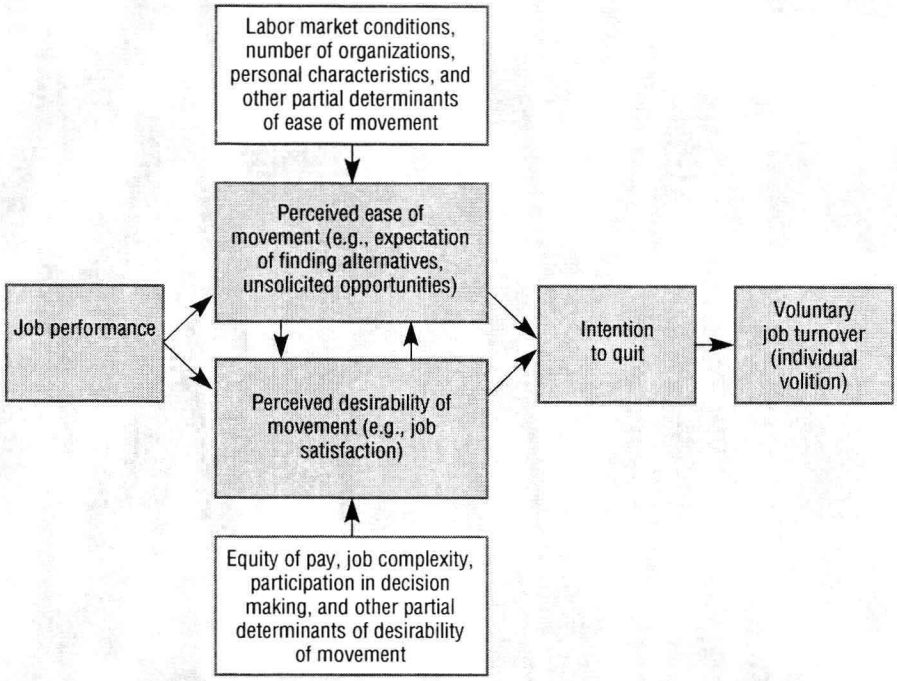
Bonus pay and sales calls are **variables,** reflecting the concepts of reinforcement and habits. Because variables are at the empirical level, variables may be measured. Thus, the scientific method has two basic levels:

> . . . the empirical and the abstract, conceptual. The empirical aspect is primarily concerned with the facts of the science as revealed by observation and experiments. The abstract or theoretical aspect, on the other hand, consists in a serious attempt to understand the facts of the science, and to integrate them into a coherent, i.e., a logical, system. From these observations and integrations are derived, directly or indirectly, the basic laws of the science.[8]

AN EXAMPLE OF A THEORY

Exhibit 3.5 is a simplified portrayal of a theory to explain voluntary job turnover—that is, the movement of employees to other organizations. Two concepts—(1) the *perceived desirability of movement* to another organization and (2) the *perceived ease of movement* from the present job—are expected to be the primary determinants of *intention to quit*. This is a proposition. Further, the concept *intention to quit* is expected to be a necessary condition for the actual *voluntary job turnover behavior* to occur. This is a second proposition that links concepts together in this theory. In the more elaborate theory, *job performance* is another concept considered to be the primary determinant influencing

EXHIBIT 3.5 **A BASIC THEORY EXPLAINING VOLUNTARY JOB TURNOVER**[9]



both *perceived ease of movement* and *perceived desirability of movement.* Moreover, perceived ease of movement is related to other concepts such as *labor market conditions, number of organizations visible* to the individual, and *personal characteristics.* Perceived desirability of movement is influenced by concepts such as *equity of pay, job complexity,* and *participation in decision making.*

A complete explanation of this theory is not possible; however, this example should help you understand the terminology used by theory builders.

VERIFYING THEORY

In most scientific situations there are alternative theories to explain certain phenomena. To determine which is the better theory, researchers gather empirical data or make observations to verify the theories.

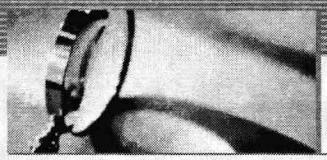
TO THE POINT

If facts conflict with a theory, either the theory must be changed or the facts.

BENEDICT SPINOZA

Maslow's hierarchical theory of motivation offers one explanation of human behavior. For example, Maslow theorizes that individuals will attempt to satisfy physiological needs before self-esteem needs. An alternative view of motivation is provided by Freudian (psychoanalytic) theory, which suggests that unconscious, emotional impulses are the basic influences on behavior. One task of science is to determine if a given theoretical proposition is false or if there are inconsistencies between competing theories. Just as records are made to be broken, theories are made to be tested.

> It must be possible to demonstrate that a given proposition or theory is false. This may at first glance appear strange. Why "false" rather than "true"?



RESEARCH INSIGHT

THEORY AND SONG

This song (attributed to George Schultz, a former U.S. Secretary of State) is sung to the lively tune *Silver Dollar.*[10]

A fact without a theory
Is like a ship without a sail,
Is like a boat without a rudder,
Is like a kite without a tail.
A fact without a figure
Is a tragic final act,
But one thing worse
In this universe
Is a theory without a fact.

> Technically, there may be other untested theories which could account for the results we obtained in our study of a proposition. At the very least, there may be a competing explanation which could be the "real" explanation for a given set of research findings. Thus, we can never be certain that our proposition or theory is the correct one. The scientist can only say, "I have a theory which I have objectively tested with data and the data are consistent with my theory." If the possibility of proving an idea false or wrong is not inherent in our test of an idea, then we cannot put much faith in the evidence that suggests it to be true. No other evidence was allowed to manifest itself.[11]

Business research gathers facts to verify theories. However, the researcher who wishes to identify inconsistency within a particular theory must understand the difference between facts and theories:

> Facts and theories are different things, not rungs in a hierarchy of increasing certainty. Facts are the world's data. Theories are structures of ideas that explain and interpret facts. Facts do not go away when scientists debate rival theories to explain them. Einstein's theory of gravitation replaced Newton's, but apples did not suspend themselves in midair pending the outcome.[12]

HOW ARE THEORIES GENERATED?

Many students ask, "Where do theories come from?" Although this is not an easy question to answer in a short chapter on theory in business research, we shall nevertheless explore this topic briefly.

In this chapter, theory has been explained at the abstract, conceptual level and at the empirical level. Theory generation may occur at either level.

deductive reasoning
The logical process of deriving a conclusion about a specific instance based on a known general premise or something known to be true.

At the abstract, conceptual level, a theory may be developed with deductive reasoning by going from a general statement to a specific assertion. **Deductive reasoning** is the logical process of deriving a conclusion about a specific instance based on a known general premise or something known to be

RESEARCH INSIGHT

BALLISTIC THEORY

Ballistic theory is a theory because it deals with measurable factors, because it states their relationships in detail, and because any one factor can be fairly completely determined by a knowledge of all the others.[13] Given all of the factors except the initial speed of the projectile, an engineer can determine what that speed was. Asked to change the point of impact, he can suggest several ways in which this can be accomplished—all of which will work.

It is common knowledge that the behavioral sciences are not as advanced as the physical sciences. What this means, in effect, is that no one has yet defined all of the factors in human behavior or determined the influence that each has on events. In fact, no one has really done a very good job of determining what an event is, that is, how to measure it or what to consider relevant about it.

Again, an example may help explain the dilemma. It is irrelevant to ballistic theory that John Gingrich is standing beside the 155 mm rifle when it is fired. It may not be irrelevant to consumer behavior theory that he is standing beside the person who selects a necktie. It is not relevant to ballistic theory that the gunner's father once carried an M-1. It may be relevant to consumer behavior theory that the automobile purchaser's grandfather once owned a Ford.

true. For example, we know that *all managers are human beings.* If we also know that *Steve Hazelwood is a manager,* then we can deduce that *Steve Hazelwood is a human being.*

inductive reasoning
The logical process of establishing a general proposition on the basis of observation of particular facts.

At the empirical level, a theory may be developed with inductive reasoning. **Inductive reasoning** is the logical process of establishing a general proposition on the basis of observation of particular facts. All managers that have ever been seen are human beings; therefore, all managers are human beings.

Suppose a stockbroker with 15 years' experience trading on the New York Stock Exchange repeatedly notices that the price of gold and the price of gold stocks rise whenever there is a hijacking, terrorist bombing, or military skirmish. In other words, similar patterns occur whenever a certain type of event occurs. The stockbroker may induce from these empirical observations the more general situation that the price of gold is related to political stability. Thus, the stockbroker states a proposition based on his or her experience or specific observations.

Over the course of time, theory construction is often the result of a combination of deductive and inductive reasoning. Our experiences lead us to draw conclusions that we then try to verify empirically by using the scientific method.

OVERVIEW OF THE SCIENTIFIC METHOD

It is useful to look at the analytic process of scientific theory building as a series of stages. Seven operations may be viewed as the steps involved in the application of the scientific method:

1. Assessment of relevant existing knowledge of a phenomenon
2. Formulation of concepts and propositions

3. Statement of hypotheses
4. Design of research to test the hypotheses
5. Acquisition of meaningful empirical data
6. Analysis and evaluation of data
7. Proposal of an explanation of the phenomenon and statement of new problems raised by the research[14]

An excellent overview of the scientific method is presented in Robert Pirsig's book *Zen and the Art of Motorcycle Maintenance:*

> Actually I've never seen a cycle-maintenance problem complex enough really to require full-scale formal scientific method. Repair problems are not that hard. When I think of formal scientific method an image sometimes comes to mind of an enormous juggernaut, a huge bulldozer—slow, tedious, lumbering, laborious, but invincible. It takes twice as long, five times as long, maybe a dozen times as long as informal mechanic's techniques, but you know in the end you're going to get it. There's no fault isolation problem in motorcycle maintenance that can stand up to it. When you've hit a really tough one, tried everything, racked your brain and nothing works, and you know that this time Nature has really decided to be difficult, you say, "Okay, Nature, that's the end of the nice guy," and you crank up the formal scientific method.
>
> For this you keep a lab notebook. Everything gets written down, formally, so that you know at all times where you are, where you've been, where you're going and where you want to get. In scientific work and electronics technology this is necessary because otherwise the problems get so complex you get lost in them and confused and forget what you know and what you don't know and have to give up. In cycle maintenance things are not that involved, but when confusion starts it's a good idea to hold it down by making everything formal and exact. Sometimes just the act of writing down the problems straightens out your head as to what they really are.
>
> The logical statements entered into the notebook are broken down into six categories: (1) statement of the problem, (2) hypotheses as to the cause of the problem, (3) experiments designed to test each hypothesis, (4) predicted results of the experiments, (5) observed results of the experiments and (6) conclusions from the results of the experiments. This is not different from the formal arrangement of many college and high-school lab notebooks but the purpose here is no longer just busywork. The purpose now is precise guidance of thoughts that will fail if they are not accurate.
>
> The real purpose of scientific method is to make sure Nature hasn't misled you into thinking you know something you don't actually know. There's not a mechanic or scientist or technician alive who hasn't suffered from that one so much that he's not instinctively on guard. That's the main reason why so much scientific and mechanical information sounds so dull and so cautious. If you get careless or go romanticizing scientific information, giving it a flourish here and there, Nature will soon make a complete fool out of you. It does it often enough anyway even when you don't give it opportunities. One must be extremely careful and rigidly logical when dealing with Nature: one logical slip and an entire scientific edifice comes tumbling down. One false deduction about the machine and you can get hung up indefinitely.
>
> In Part One of formal scientific method, which is the statement of the problem, the main skill is in stating absolutely no more than you are positive you know. It is much better to enter a statement "Solve Problem: Why doesn't