TOWARD A MULTILEVEL THEORY OF LEARNING:

HOW INDIVIDUALS, ORGANIZATIONS,

AND REGIONS LEARN TOGETHER

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ABSTRACT

There are substantial bodies of theoretical literature regarding learning by individuals, organizations, and regions. There appears to be no theory that applies at all levels, or explains how learning at one level relates to learning at other levels. This study reviews the theoretical literature on individual, organizational, and regional learning, applies textual analysis to chart the gap between these bodies of literature, and posits an explanation that fills this gap. The fundamental theory proposed here is that community yields learning, or that community makes people smarter. A conceptual framework is provided for explicating and evaluating the proposed theory, and it is illustrated via a thought experiment. Community is presented as a phenomenon or process, rather than a place or thing, and learning as a gain in capabilities, which are equated to real freedoms: specifically, liberty, prosperity, and wellness. This study details how community functions result in increased capabilities, and provides suggestions on how this proposition might be applied in practice and investigated through research.
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LIST OF ABBREVIATIONS

ICT – information and communication technology

GIS – geographic information system

GPS – geographic (or global) positioning system

GB – Greenfield Broadband

GRF – Greenfield Regional Foundation

B-C-V – behaviors, connections, and visions

LPW – liberty, prosperity, and wellness

HIT – health information technology

IT – information technology
CHAPTER I
INTRODUCTION

Overview and Background to the Problem

This dissertation will suggest and explicate a multilevel theory of learning. My intention is to provide an explanation of learning at the individual, organizational, and regional levels, and how learning at each level of social aggregation relates to learning at other levels. Rather than suggesting an entirely new theory, I identify a gap between bodies of literature and propose a synthesis of a wide range of theories related to learning. And, I provide a conceptual framework—which builds on and extends existing concepts—that can be used to apply and test the theory. Finally, I illustrate use of the proposed theory and conceptual framework by applying them to broadband high-speed internet services and higher education.

Statement of the Problem

Individuals learn. Organizations learn. Even regions learn. These assertions are well established by substantial bodies of empirical, practical, and theoretical literature, which are reviewed below. While there is some literature that relates learning at different levels of social aggregation—Coleman (1988) and Upton and Egan (2010) for examples—there is no theory that clearly links all three levels; and there is no theory that applies at all levels. The literature review, below, will substantiate these assertions.
There are numerous theories of learning, a multitude of theories related to learning, and even more literature on the application of the theoretical literature. All behavioral sciences, major areas of philosophy, and several academic disciplines that combine other disciplines (communication and information sciences, management science, political science, policy science, and economic geography and regional science) contribute to the development of a comprehensive, multilevel theory of learning. Similarly, such a theory could contribute to criticism, explanations, improvements, and predictions in many domains of human endeavor. Thus the core problem of this dissertation is to propose a theory that is broadly inclusive and widely applicable.

The problem may be best understood in a specific context: How individuals, organizations, and regions acquire and use high-speed internet access, or broadband, and how that interacts—or doesn’t—with higher education. In order to use broadband, individuals must have some understanding of internet applications and content (i.e., the worldwide web), a computer or similar device, skills necessary to make use of that device, and broadband. More importantly, individuals must have a purpose for using the technology, even if that purpose is mere curiosity or to pass the time. Organizations face similar knowledge requirements to make use of broadband, but with even greater emphasis on purpose. Hypothetically, an organization can increase efficiency and efficacy via broadband—becoming more productive and profitable—but only if members of the organization know how to use the technology for the organization’s purpose. Of course, the knowledge and technology must be available in the region—particularly broadband, which is physical infrastructure—for individuals and organizations. But, why deploy the infrastructure unless people know how and why to use it?
Higher education presents similar practical problems in need of a theoretical explanation. As a subject, it is useful for illustrating different aspects of this theory. Individuals learn—at least in part—via higher education. That learning is applied via organizations, and contributes to a region’s knowledge base. At the same time, colleges and universities must learn as organizations to accomplish their purposes, and so must the individuals who comprise them. If regions are to build and capitalize on institutions of higher education, they must learn, too. Broadband is increasingly important to such efforts, and higher education can impact the value of broadband as a purveyor of knowledge. There is an interaction between infrastructure and institutions that has implications for learning across levels.

Broadband and higher education seem to require learning at the regional, organizational, and individual levels. And, both are nominally useful for learning at and across levels. They are prime examples of interdependence of learning at various levels of social aggregation. How and in what ways such things are interdependent is just the type of thing I hope to provide a way of explaining. The intersection of these two topics—broadband and higher education—provides a specific context for detailing the problem and for illustrating a possible solution.

Purpose of the Study

The purpose of this study is to propose a theory not from empirical observation but from analysis of existing, validated theories. I propose to identify a gap between theories about learning at different levels of social aggregation and then extend and integrate those theories to suggest an explanation that links them together. My purpose is also to illustrate my concepts and conjectures about how learning occurs across levels by applying them to broadband and higher education.
Research Questions and Hypotheses

What is the relationship between learning at the individual, organizational, and regional levels? As will be shown from the literature review, there is currently no theory to explain how they relate. The goal of my dissertation will be to explain this relationship, and to provide a multilevel model of learning that is useful for measuring and predicting, for describing and explaining, and for critiquing and improving learning in such context. I address learning by individuals, organizations, and regions in a way that is consonant with and synthesized from accepted theory: The problem is not with existing theories, but with the gaps between them. So, my goal is to provide a potential explanation that bridges those gaps, and can be used to generate hypotheses about how learning occurs across levels of social aggregation.

Hypothetically, there is a relationship between learning at various levels of social aggregation. Further, we can surmise that this relationship is positive, that learning at the individual level complements and promotes organizational learning, which has a similar relationship to regional learning, and vice versa. What is the effect of learning at one level on learning at other levels, and what is the mechanism of this effect? How might we explain and predict this effect, let alone improve learning across levels? These are the questions I intend to address in my dissertation. I present a tentative explanation, and provide a specific consideration of how that explanation might be applied to acquiring and using broadband.

Conceptual Framework

Part of the problem is that we have no conceptual framework for examining the relationship between learning at different levels of society, and for assessing whether and to what extent learning at one level contributes to learning at other levels. This means we have an
incomplete understanding of learning, so there is a scholarly problem. If theory at one level is inconsistent with, even contradicts, theory regarding another level, then there are possible problems with these explanations. Practically, the problem is that current understanding of learning at different levels may be incomplete and fragmented, and an impediment to performance improvement. I propose to provide a conceptual framework that is theoretically and practically useful for understanding learning across levels of society.

That said, the conceptual foundations of this study are human agency and social construction. Human agency is the concept that humans act in their own interests. It is prevalent in economic (Coase, 1960; Arrow & Hurwicz, 1977), psychological (Simon, 1991; Bandura, 2001, 2006), and sociological (Thibault & Kelley, 1952; Roloff, 1981; Latour, 2005) theories. Social construction is the concept that concepts, institutions, and knowledge are created, and reality is defined, via human interaction (Berger & Luckman, 1966; Blumer, 1969; Vygotsky, 1978; Habermas, 1984; Giddens, 1986; Bruner, 1990). This primarily a sociological theory but been applied to psychology (Bandura, 2001) and economics (Cooke & Leydesdorff, 2006) has implications for all forms of knowledge, including science: As Kuhn (1996) famously noted, what passes as scientific knowledge is socially constructed.

As a theoretical dissertation, theory and theorizing are also conceptually important. My conceptual approach to theory is that of post-positivism and postmodernism, particularly drawing on Kuhn (1996), Popper (2003), Lyotard (1984), Lakatos (1976, 1978). Generally, this perspective theory is simply a conjecture about the nature of reality. The fundamental criteria for theory is that it be falsifiable because, as Popper (2003/1963) pointed out, it is impossible to prove something true. Kuhn (1996) holds that the primary role of science is to advance and/or support normal science via accretion of evidence. The build up of evidence and elaboration
happens within the confines of narrow scientific worldviews. Lakatos (1976, 1978) occupies something of a middle ground between Popper and Kuhn, holding that theories should provide more explanatory power than their predecessors. Lakatos noted that various scholarly disciplines have a core set of ideas that are inviolate, and a periphery that is constantly evolving. He essentially concludes that theory must be judged by its consistence with accepted knowledge, its heuristic value, and the novelty of its predictions. Feyerabend (1993) encouraged—to put it mildly—skepticism toward scientific claims, maintaining that it science has no grounds for priority over other claims about the world. All of this can be seen in the context of what Lyotard (1984) termed the postmodern condition. To Lyotard, science is but a general metanarratives about what is real and true, and the postmodern condition is seeing metanarratives for what they are: stories told to validate the teller.

Jaccard and Jacoby (2010) define theory as, “a set of statements about the relationship(s) between two or more concepts or constructs” (p. 28). Theory is a conceptual tool for thinking and acting. “It may be decisive though not authoritative,” as Lindblom and Cohen (1979, p. 79) note. I do not seek to make authoritative statements about relationships between concepts or constructs. Instead, I simply hope to point out potential consilience between various research programs (to use Lakatos’s term). I come with a Feyerabendian appreciation for the limits of science, and a Lakatosian recognition that evidence enhances but does not make theory. Purely conceptual work is important for advancing scholarship and promoting emancipation.

Rationale for the Study

This is a theoretical dissertation, the data for which are prior theories. A theoretical dissertation answers its research question by identifying and filling the gaps in existing literature
A theoretical dissertation might extend or integrate existing theories, or introduce new theories (Institute for the Psychological Sciences, 2012). And, it should discuss the practical implications of the theory, as well as implications for future research (London School of Economics and Political Science, 2011).

The criterion for including existing theories has to be their relevance to learning and their intersubjective validity: How well accepted are they across academic disciplines? Valid theory should provide a consistent, complete, and falsifiable explanation of its topic (Popper, 1963/2003; Lakatos, 1976, 1978; Moore, 2001). And, of course, practical utility provides another criterion (Lakatos, 1976, 1978; Feyerabend, 1993). These criteria also apply to the output of this dissertation. This will be an attempt to synthesize a consistent, complete, and falsifiable multilevel theory of learning that has explanatory power and usefulness. These criteria are also the rationale for the study.

Significance of the Study

This dissertation will address gaps between theoretical literature regarding learning by individual persons, organizations, and geographic regions. In their review of literature on
organizational learning Bapuji and Crossan (2004) conclude that there is a need for better understanding of levels of learning beyond single organizations. The literature review, below, maps out these gaps. In his study of how place-based communities learn, Morse (2004) suggests that, “the relevance of group and individual learning should not be ignored, and indeed, a rich model of organizational, interorganizational, or community learning ought to consider the linkages between levels” (p. 58). I propose to provide such a model (actually three models, from a single general, proposed theory), identify opportunities for empirical research and practical application, and illustrate how the models apply, including guidelines for empirical research, focusing on how broadband is acquired and used. Basically, the significance of this study is that, by addressing a gap between existing bodies of literature, it generates opportunities for research and for improving learning practices.

Definitions of Terms

In this proposal, level refers to extent of social aggregation. Individual means a single person. Organization refers to a group of individuals brought together for some purpose. A region is a large number of individuals (and organizations) in a geographic area. And, community is the phenomenon of persons sharing a sense of belonging, commitment, and influence. Capability is ability given capacity. Knowledge is informed true belief. Learning is the action, phenomenon, or process of gaining capabilities and knowledge. A theory is simply an explanation or rationale for why something occurs or how different things are related. All of these terms will be discussed in detail.
Delimitations of the Study

This is to be a theoretical dissertation. And, it is concerned with relations between levels of social aggregation. It will not involve analysis of primary data. The analysis is limited to theoretical literature regarding learning by individuals, organizations, and regions, and specifically to identifying commonalities and gaps among/between these bodies of literature. Discussion of the theory will be limited to the adoption and use of broadband, and to the transformation of higher education.

Limitations of the Study and Assumptions

The primary limitation of this study is that, while it will provide a conceptual framework and suggest an explanation, I do not test the conjecture other than conceptually. The proposed theory will be consonant with diverse existing theories, and will provide potential means for filling the gap between bodies of literature, but it will not involve primary data gathering and analysis.

Summary and Dissertation Outline

I propose to synthesize an explanation and rationale for how learning occurs, and is related, across levels of social aggregation. First, I review essential literature of individual, organizational, and regional learning, including relevant literature from economics, philosophy, psychology, sociology, and other disciplines, based on the criterion of relevance. Second, I summarize methods for analyzing texts, and delve into theory building and model building methods. Then I’ll provide an analysis of the literature to identify differences and gaps as well as commonalities. The proposed theory and conceptual framework will comprise the bulk of the
third section, including general models derived from the theory. Lastly, I illustrate the theory by applying it to broadband and higher education. This illustration will also provide guidance on how to operationalize variables, develop metrics, and apply the proposed theory for practical and scholarly purposes.
CHAPTER II
LITERATURE REVIEW

Learning by individuals

The major early theories of learning were wholly behavioral and do not allow for intentions or mind. Mind is defined as the faculty of living things that allows them (us) to sense, respond to, and remember the world; the organ of consciousness, emotions, and imagination (mind, n.d.). Behaviorist theorists, most notably Thorndike (1910), Pavlov (1927/2003), and Skinner (1950), equate learning to conditioning. Changes in behavior come from negative or positive reinforcements of responses to stimulus. Cognitivist theories of learning see the mind as an information-processing mechanism. For cognitivists, such as Ebbinghaus (1913), Piaget (1973), and Bruner (1966, 1990), the mind changes via the acquisition of information and processing it into knowledge, which leads to changes in behavior. Frames or models for organizing knowledge—schemata (Kant, 1781/2000; Piaget, 1973, 1983; Hirsch, 1987)—are applied to data generated by the senses, allowing for recognition, decision-making and sense-making, and the connection and transfer of knowledge from one setting to another (for example, knowing that “night is dark” is automatically associated with other concepts about darkness and night).

Cognitive science describes mental processes in terms of automaticity (effortless cognition) (Bargh and Ferguson, 2000), accessibility (salience, priming, effects of experience)
Baldwin, et al., 1996), and assimilation/accommodation (incorporation of new information into existing/new schemas via accretion, tuning, and restructuring) (Piaget, 1983). These processes operate through frames of reference, models, theories, or worldviews—schemata (Kant, 1781/2000; Neisser, 1967; Rumelhart, 1980; Piaget, 1983; Hirsch, 1987) that focus learning but can also interfere with it via confirmation bias (cognitive dissonance and group-think) (Nickerson, 1998). All of these basically define the structure of knowledge, how schema relate to each other, are created, recalled, used, and changed. Increasingly, schemata are seen as embodied—integrated with behavior—rather than just something in our heads (Rumelhart, 1980; Isanski & West, 2010).

The cognitivist approach is built on an input-output model that is explicated by general systems theory (Bertalanffy, 1950, 1968). It is also closely related to the general models of communication (Shannon & Weaver, 1949), economics (Leontief, 1986; Miller & Blair, 2009), and various biological and social phenomena, as well as the most widely applied design of computers, known as the von Neumann model (Godfrey & Hendry, 1993; Barney, 2011). Multiply input-output models and connect them as a network, and you have the basis of the connectionism (Marcus, 2001). The networks are essentially sets of rules and strategies, which are analogous to neurons, for dealing with uncertainty (Marcus, 2001). There is no central processor, as in the cognitivist model; intelligence is distributed throughout the network’s simple components (Marcus, 2001). Connectionism sees learning as changes, driven by data, in the patterns of activation of those components; changes that result in improved outcomes (Marcus, 2001).

Constructivism is based on the sociological recognition that institutions—at very least—are built via social interaction (Berger & Luckman, 1966). The psychological implication is that
individuals construct knowledge as they learn (Bruner, 1990), informed by interacting with others (Vygotsky, 1978). Schemata are constructs or theories developed via variation and selection/testing (Piaget, 1973); and development depends on the learner’s existing knowledge and social setting (Vygotsky, 1978). The practical implication for education is that powerful learning occurs as we build things, and even more so when we build them together (Papert, 1980), allowing collaborative creation and selection of schema. Wittrock (1992) sees learning as “the process of generating relations both among concepts and between experience or prior learning and new information” (p. 532). His approach is similar to constructivism but he downplays structural elements such as schemata and emphasizes the generative functions.

Each theory of learning has its critics. Chomsky (1967) identified fundamental weaknesses in behaviorism when he pointed out its fundamental weakness for explaining how we learn language. Pinker and Mehler (1988) almost do the same for connectionism. Hacking (1999) points out the limitations of constructivism. But each has its strengths. Latour (2003) could be speaking of any theoretical approach as he calls for preserving the aspects of constructivism that are useful for improving learning.

Bandura (1977, 1986, 1997, 2001, 2006) provides theoretical framework that accommodates the stronger points of other learning theories. Individuals are agents who regulate—to some extent—their own behaviors. Behavior is determined by personal and social factors, which are affected by behavior. One’s perceived self-efficacy and expected outcomes influence learning, as it occurs via experience and vicariously via behavioral models, and are influenced by it. Fundamentally, Bandura’s (2001) theory is based on a simple idea; or, more accurately, an axiom:
A functional consciousness involves purposive accessing and deliberative processing of information for selecting, constructing, regulating, and evaluating courses of action. This is achieved through intentional mobilization and productive use of semantic and pragmatic representations of activities, goals, and other future events. (p. 3)

Bandura carefully defines terms and variables, and his theoretical approach—social cognition and sociocognitive learning theory—is flexible enough to accommodate tests of conflicting hypotheses and allow theoretical enhancements.

Drive and related theory

In drive theory the fundamental issue is drive. While the field has largely moved beyond Freud’s (1961/1930) drive theory, Freud nonetheless provides a basis with his concepts of eros and thanatos as being opposing drives that are activated by biology and circumstances, motivating behavior to satiate, and to repress when it is not beneficial or practical to fulfill them. Hull (1951) and Spence (1958) theorized that responses to stimuli are a function of basic drives mediated by learned behaviors. Maslow (1970) suggests a more detailed and nuanced drive theory, based on a hierarchy of needs in which higher-level needs for belonging, esteem, and self-actualization are addressed after more basic physiological and safety needs are fulfilled.

Lawrence and Nohria (2002) update Freud’s drive theory, based on findings in cognitive science. They argue that behind our motivations and needs are four fundamental, biologically-based drives: to acquire, to bond, to defend, and to learn. The drives are the basis for human behavior, decision-making, emotion, and reason. There are tensions between these drives, which are resolved via innate human skills (communicating, cooperating, gathering, hunting, etc.). The basic biological drives to acquire, bond, defend, and learn are the rule-base for human cognition, forming emotions, guiding reason, and giving rise to complex dynamic behaviors and systems.
via innate skills. The innate skills provide the basis for more complex and specialized capabilities. Learning is the drive to improve skills and better acquire, bond, and defend.

Drive can include internal/intrinsic and external/extrinsic motivations (Deci & Ryan, 1985), instrumental motivation to achieve means to some end, and integrative motivation to belong (Carreira, 2005). Some external factors may motivate, while others can dampen motivation if not present (Herzberg, 1959). Motivation is related to intentions and self-concept, particularly vis-à-vis other persons, the object of need, what is required to fulfill the motive, and perceptions of societal norms (Rotter, 1954; Heider, 1958; Fishbein & Ajzen, 1975; Bandura, 1997).

Ryan and Deci (2000; Pink, 2009) identify needs for autonomy, competence, and relatedness as fundamental human motivators. These needs emerge as intrinsic motivations. When actions meet needs, motivation to act is internalized. Internalized motivation drives intention. So, when actions meet needs, one is to act on one’s own. Extrinsic motivations such as punishments and rewards disconnect actions from these fundamental needs, undermining internalization (Kohn, 1993; Ryan & Deci, 2000; Pink, 2009). Other scholars, particularly those studying second-language acquisition, have made a further distinction between behavior as a means that is instrumental and integrative motivations (Carreira, 2005). According to Carreira (2005), behavior motivated by desire to belong is more efficacious than behavior motivated by desire to achieve, and both motivations are more powerful than extrinsic motivation but less so than fully intrinsic motivation.

Reflection is consideration of one’s self, of one’s actions and their outcomes. It seems to be essential to learning. Schön (2008) discusses how practitioners reflect as they act, and how they reflect afterward. The critical difference between short-term reasoning and careful analysis
is further explicated by Kahneman and Tversky (1979; Kahneman, 2011). Some cognitive processes occur rapidly and transparently. These processes are inherently conservative and much more sensitive to risk of loss than to prospect of gain. Slower cognitive processes, in contrast, allow the self to be disengaged in order to better balance potential benefits and risks via calculation. Schön (2008) says that practitioners maintain a repertoire of intellectual tools for applying as they reflect. They use these tools to choose a course of action. Bandura (2001) emphasizes self-reflection as essential to self-regulation and foresight, guided by intention. More fundamentally, reflexivity—cause is shaped by effect, the self authors the self, the actor is driven by the action, agents create institutions that define agents—can be seen as essential to action and cognition, as well as critical for learning (Berger & Luckmann, 1966; Maturana & Varela, 1980; Giddens, 1986; Bandura, 2001). Society serves as a mirror by which the individual comes to know herself or himself.

The human-capabilities approach to development (Sen, 1988, 1999; Nussbaum, 2000; Clark, 2005) sees the ultimate result of development as freedom and equates capabilities with freedom. The capabilities approach distinguishes between actual state-of-being (“functioning,” in Sen’s terms) and possible states of being, emphasizing ability to choose functionings from numerous possibilities, and between “negative” freedom from constraint on capabilities and “positive” freedom that enables capabilities. Sen, Nussbaum, and Clark do not specifically link capabilities to drives, but they do note that capabilities generally involve fulfilling one’s needs. Their focus is not so much on what is chosen as on the nature and number of possibilities from which one can choose; the opportunity costs of each possibility, and the results of each choice. Conceptually, drives—whether autonomy, competency, and relatedness, or to acquire, belong, and defend—fit with the capabilities approach.
Frankl (1984) maintains that, “Man’s search for meaning is the primary motivation … meaning [that] is unique and specific in that it must and can be fulfilled by him alone” (p. 105). It is also our primary responsibility, according to Frankl, to respond to life with a unique answer. The same can be said for all entities—corporations, associations, institutions, etc.—and especially for leaders. The drive for meaning dovetails theoretically with theories of motivation and drive theory. These drives represent the why of learning—to acquire, bond, defend, and learn; to be autonomous, competent, and related; for instrumental, integrative, and intrinsic purposes, and perhaps extrinsic ones as well.

In summary, the authors of the literature review above are all talking about basically the same (or at least closely interrelated) elements—about capabilities, why capabilities are important, and what causes capabilities to increase. According to this literature, freedom involves how we connect to others. Positive freedoms support drive fulfillment, and negative freedoms suppress it. The literature reviewed above says, in sum, that freedom doesn’t just allow drive fulfillment. Freedom is a fundamental objective of human drives.

Paradoxically, negative freedoms motivate action, while positive freedoms can make us lazy. Fear of losing can itself be a negative freedom. Promise of rewards can reduce interest in positive freedoms. We tend to respond stronger to risk of loss than to opportunity for gain (Kahneman & Tversky, 1979). The works referenced in this section, taken together, explain this paradox. Essentially, the mind continually seeks to improve its abilities in order to make the most of its limited capacity.

The question becomes what, in conjunction with drives and motivations, determines increases in capabilities? What factors maximize learning at all levels? What maximizes it at any
level? Are the factors for learning at any level different from the factors at other levels? How do we learn, and how do we improve our ability to learn?

Regardless of our drives, how and whether one acts can be predicted by intention to act, mitigated by perceived external cultural, economic, physical, social, etc., constraints (Fishbein & Ajzen, 1975; Ajzen, 1985, 1991). It is important to recognize that characteristics of objects in the environment, and the environment itself, variably afford, or are latently conducive to, certain action possibilities that are independent of one’s abilities (Gibson, 1977; Norman, 1999), but recognizing that such affordances increase agency. If one believes the outcomes of an action will be beneficial and desirable, and her or his significant others value the action, he or she will have a strong intention to act, and is highly likely to do so. With such beliefs, the individual will investigate what is involved in acting, and this information will inform intention.

Agency in socioeconomic context

Agents make use of various assets—facilities, information, materials, relationships, tools, etc.—as they act. A simple fact of reality, which forms the basis of economics, is that assets are relatively scarce; There are more agents and uses than there are available assets. Fundamental economic theory (Smith, 1776/1904) holds that assets naturally accrue to the most-valued uses via the market. Consumers express their preferences via purchases. Those who efficiently produce what consumers demand, acquire more assets. Market efficiency—connecting demand with supply with minimal added costs—depends on free flow of information. Productive efficiency comes from structuring the production process, dividing tasks among workers.

Agents do not act in a vacuum; they interact with other agents. They associate with others and with places, and they exchange information and resources, based on self-interest. This
exchange is the basis of groups (Thibault & Kelley, 1952), of societal change and constancy (Roloff, 1981), and of networks that enable or resist change (Latour, 2005). Identity inherently involves self-awareness and self-concept, which shape interaction. Agents’ identification with a group, and acting in the groups’ interests, defines personal and group identities, based on the inherent human tendency to categorize, to differentiate, and desire to be part of the ingroup (Tajfel, 2010). Action to establish and maintain relations is based on judgments about the outcomes of interactions, and on the alternatives to or dependence on the relationship (Homans, 1958; Befu, 1977).

Identity, interaction, and intention all rest on an infrastructure of beliefs. They are learned, but they are also constructed. They are built on beliefs about autonomy, competency, and relatedness—beliefs about what these things are, about criteria for each, and beliefs of how well others and self meet these criteria. Identity is built via interaction, which informs intention, which leads to action. All of this—all knowing—occurs in cultural and natural context. It is situated in (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991), and is dependent on the physical aspects of the body (Varela, Thompson, & Rosch, 1991; Isanski & West, 2010; Wilson & Foglia, 2011).

A fundamental issue for agents is information and uncertainty—information is, for present purposes, that which reduces uncertainty. As with other assets, information is unevenly distributed, and agents have limited cognitive capacity (Simon, 1991). Asymmetrical information can lead to sub-optimal choices, cheating and exploitation, and costs and risks being foisted on those who do not receive concomitant benefits (Coase, 1960; Arrow & Hurwicz, 1977). Agents often work on behalf of others—principals, in economic terms—but tend to place their own
interests above those of the principals. Agents may also act collectively as means to more effectively pursue their common interests.

Rational decision-making requires agents to identify alternatives, determine the consequence of choices, and compare the consequences; the best, most rational choice is the alternative with the best consequences (Simon, 1976). People in close proximity—crowds—often behave as one (Blumler, 1951), yet it can be difficult for those with common interests to act together (Olsen, 1965). Smelser (1965) identifies the components of collective behavior as values, norms, motivation, organization, and situational facilities—pretty standard fare for social sciences—but he goes on to note:

The major determinants are structural conduciveness, strain, crystallization of a generalized belief, precipitating factors, mobilization for action, and social control. We conceive the operation of these determinants as a value-added process. Each determinant is a necessary condition for the next to operate as a determinant in an episode of collective behavior. As the necessary conditions accumulate, the explanation of the episode becomes more determinate. Together the necessary conditions constitute the sufficient condition for the episode. It should be stressed, moreover, that we view the accumulation of necessary conditions as an analytic, not a temporal process. (Smelser, 1965, pg. 24-25)

Decisions to act collectively are based on how benefits and costs are distributed, and they accrue to those involved in collective action (Olson, 1965). The greater the costs are, the larger the group is, and the less the subjective value of action is, Olson (1965) posits, the less likely it is that group members will act collectively. Under such conditions Smelser’s analytical, value-added process cannot get started or progress. Inevitably, those with the most assets must lead the collective decision, and those with the least participate and benefit without contributing (i.e. they are “free riders”).
Communities, markets, and organizations arise from a need to minimize the free-rider problem. They are means to reduce the transaction costs of searching, contracting, and coordinating (Williamson, 1981), to maximize social sense-making via environmental scanning, interpretation, and guides for action (Weick, 1995), and to decision-making process of analysis, design, and execution (Simon, 1976). Communities emerge wherever agents find a sense of belonging, influence, needs fulfillment, and shared emotional commitment (McMillan & Chavez, 1986).

Decision-making—as well as community-building, organizing, and sense-making—is a social undertaking because information is accessed via social ties, particularly weak ties (Granovetter, 1973, 1983). Agents are embedded in networks that determine access to information and knowledge and what they see as beneficial, desirable, possible, and practical (Granovetter, 1985; Cohen & Levinthal, 1990; March, 1991; Burt, 2004; Chesbrough, 2006; Christensen, 1997/2006). Giddens (1986) theorizes that agency and social structures, i.e., institutions, are codeterminant: individual actions are constrained by, but also shape, institutional arrangements. Actions have symbolic meaning that must be interpreted, as agents interact, according to Blumer (1969), which constructs the agents’ identity even as it guides their behavior.

As they interact, agents also gain collective competence (Weick & Roberts, 1993/1996; Bandura, 2001), increase productivity (Arrow, 1962) and absorptive (Cohen & Levinthal, 1990) capacities, and innovate (Morgan, 1997; Cooke, 2002; Cooke & Leysdesdorff, 2005). The fundamental issue is that technological advancement, incremental and radical changes in the ways assets are combined and used, is the bedrock of economic growth; it also creates new
information and knowledge, making others’ information and knowledge less complete and valuable, creating competitive advantage.

Theories of individual learning initially attempted to explain acquisition of knowledge in isolation. More mature theories recognize that knowledge is intrinsically social. Essentially, learning is an increase in agency—ability to act in one’s own interests—that involves the construction and application of embodied models of the world (schemata) to one’s self, to others, and to things. As suggested by Bandura’s (1986) triadic reciprocity, one’s capabilities, or level of knowledge, depends on personal characteristics—identity and intentions, particularly—and social context, one’s communities, networks, organizations, and so forth. The former can be seen as the sum of one’s beliefs. The latter are the means to drive fulfillment, particularly for acquiring information related to drives. More than that, social structure constrains individual action even as it extends individual capabilities. The social and the personal shape each other even as they determine behavior.

Organizational Learning

Nevis, Dibella, and Gould (1995), among others, imply that all organizations are learning systems:

We define organizational learning as the capacity or processes within an organization to maintain or improve performance based on experience. Learning is a systems-level phenomenon because it stays within the organization, even if individuals change. One of our assumptions is that organizations learn as they produce. Learning is as much a task as the production and delivery of goods and services. (p. 2)

This position is built on basic economic theory. It extends from Arrow’s (1962) insights into learning by doing. It implicitly accepts Hayek’s (1945) points about the uses of knowledge,
and incorporates observations about the nature and role of institutions (Williamson, 1981, 2000; Ostrom, 1990). It also fits well with theories related to individual learning from psychology and sociology, discussed in relation to individual learning, above.

Senge (2006) makes the distinction between adaptive learning, which allows an organization to operate, and generative learning, which “enriches our capacity to create” (p. 14) and enables innovation. Cook and Brown (1999) posit that this results from a “generative dance” between knowing and knowledge, between tacit and explicit knowledge. Christensen (1997/2006) notes that innovation can vary in scope—from internal processes to external marketplace—and from sustaining current market structure to disrupting it. Organizational effectiveness can be understood, according to Quinn and Rohrbaugh (1983), in terms of focus and structure. They see focus as varying from internal to external, and structure ranging from control to flexibility. Quinn and Rohrbaugh (1983) present this as the basis for various organizational models, and for understanding core goals or values. Or, at least it is a basis for thinking about organizations’ people, productivity, acquisitions, and stability.

There is something of a bifurcation between attempts to explain how organizations learn and attempts to improve organizational learning (Argyris, 1999; Easterby-Smith & Araujo, 1999). Easterby-Smith and Araujo (1999) make a further distinction between the social and technical views of both organizational learning and learning organizations. The technical, which has dominated to date, focuses on organizational performance, particularly as measured in economic or financial terms. The social is more concerned with how meaning is constructed. Where the former eschews politics as a foil, the latter accepts it as an integral aspect of organizations.
Huber (1993/1996) argues that learning does not require a change in behavior: “An organization learns if, through its processing of information, the range of its potential behaviors is changed” (p. 126). Noting that this applies to any entity, including a society, that can acquire, distribute, interpret, and remember information, he maintains that an entity learns if even a single unit (member) acquires knowledge and recognizes it as potentially useful. The more units recognize this usefulness, the more varied interpretations of the knowledge, and the more uniform comprehensions of the interpretations are, the more learning occurs.

Huber (1993/1996) reviews literature on acquisition of knowledge by various means: congenital, experiential, and vicarious, by grafting, by intentional searching, and by unintentional noticing. He concludes that only acquisition by experience and search have been thoroughly considered, but without synthesis or conceptual work. There are many diverse factors that contribute to change in the range of potential organizational behaviors, Huber concludes, but relatively few have been studied, and there has been little substantiation of theory. The research is highly fragmented with much specialization and little collaboration or integration, according to Huber’s analysis, and is not applied to improving organizational learning.

The technical approach, exemplified by Huber (Easterby-Smith and Araujo, 1999) is behaviorist: If an organization is successful, if it maintains in the face of change or changes to overcome threats, it has learned. But the approach does not involve actually ascertaining the state of an organization’s knowledge, either prior to or after learning has apparently occurred; it offers no practical insights.

A somewhat more “social” perspective on organizational learning is offered by Weick and Roberts (1993/1996). In collective mind—which they define as “heedful interrelating” — there is careful coordination of action and knowledge. Multiple actors act jointly to contribute to
a social system, and subordinate their personal actions to the system and its outcomes. Actions of individuals are interdependent and integrated into a seamless system, the dynamics of which are “felt” or sensed rather than categorically and explicitly described or measured. Knowledge is acquired from the system via dialog and narrative, based on common artifacts and shared experience. Then, by dialog and narrative, it is fed back into the system by each individual participant. Organizational learning perpetuates and reinforces the system, even as it shapes and reinforces participants’ identities.

From this perspective learning by rather than in organizations is primarily a cultural rather than cognitive phenomenon: It is about shared meanings rather than collective behaviors (Cook and Yanow, 1993/1996); behaviors are simply means to create meaning. The implication for assessment is that only those directly engaged in the action—at least in the “systems that cannot fail” like those discussed by Weick and Roberts (1993/1996)—can tacitly assess the situation.

Weick and Roberts (1993/1996) somewhat resolve the social/technical divide by demonstrating the parallel between cognitive operations at the individual level and cultural operations at the organizational level: they operate via differential connections and patterns of nodal activation. Where these connective patterns result in habits of individuals, routines are manifest organizational behaviors. Routines are matched as appropriate to situations encountered by the organization, shaped more by past experience than future expectations, and judged in terms of the relation between actual and desired outcomes. All of this occurs within an ecology of learners within which patience is a virtue, because it allows learning effects to emerge (Levitt and March, 1988/1996).
The technical approach to learning organizations, most evident in work on intellectual capital, focuses on measuring and valuing knowledge. Stewart (1997) defines it as “intellectual material—knowledge, information, intellectual property, experience—that can be put to use to create wealth” (p. x), or “Intellectual capital is packaged useful knowledge” (p. 67). It is related to and made up of human, structural, customer, organizational, and other non-financial capital, including leadership and culture and values (Edvinsson and Malone, 1997; Stewart, 1997). Adherents to the intellectual capital approach provide complex sets of metrics that make up the seemingly simple calculation: Human Capital + Structural Capital + Relational Capital = Intellectual Capital (Edvinsson and Malone, 1997; Roos, et al., 1998), but this includes such intangibles as “Customer IT literacy,” “Innovation,” and “Motivation.”

The proliferation of variables and metrics for intellectual capital (Bontis, 2001) suggest conceptual fragmentation and a weak theoretical framework. After constructing and applying a knowledge-measurement methodology, King and Zeithaml (2003) conclude that the results of such methods have limited general value because knowledge resources vary greatly across industries and organizations. Lee, Lee, and Kang (2005) focus on the efficiency of knowledge-circulation processes in an organization—creation, accumulation, sharing, utilization, and internalization of knowledge—and claim that organizations are able to become more knowledge-intensive as the amount of resources required for these functions decreases. Knowledge circulation can be seen as collective cognition, or simply division of labor. While the concept of knowledge circulation is useful for analyzing organizational learning, it does not deal with the reality that what qualifies as knowledge is contingent on circumstances. Nor does the concept accommodate the possibility that knowledge can emerge spontaneously without a cause or source.
Krogh, Roos, and Slocum (1994) consider difficulties related to organizational knowledge—and, similarly, for regional knowledge: Knowledge is enacted by multiple knowers. It has context and scope that can be either very general or very specific. And knowledge is captured, communicated, and evaluated via language. Spender and Grant (1996) point out that knowledge is given meaning across various levels—industry, firm, department—and that quantitative methods may not be able to address this variability and richness.

Senge (2006) exemplifies the social approach to learning organizations. Learning is “expanding the ability to produce the results we truly want in life” (p. 142). This occurs via generative rather than just adaptive learning, not just surviving but also enhancing our creative abilities. “The core learning dilemma that confronts organizations [is that] we learn best from experience,” notes Senge, “but we never directly experience the consequences of many of our most important decisions” (p. 23). More succinctly, “every organization is a product of how its members think and interact” (Senge, Kleiner, Roberts, & Ross, 1994, p. 48). But organizations are complex dynamic systems in which “doing the obvious thing does not produce the obvious, desired results” (p. 71). Feedback can be reinforcing/amplifying or balancing/stabilizing; small amounts of the latter can lead to big changes, and small amounts of the former can hamper big changes. Both types of feedback consist of some source(s) of information, represented by one or more variables, which interact to inform behavior. The fundamental factors that can be derived from Senge (2000, 2006)—although he doesn’t put them so simply—are connections and vision. Connections and vision represent the interactions and thoughts that amplify—or attenuate—each other.

Other notable social approaches to organizational learning include Choo (1998), and Davenport and Prusak (1998), who are somewhat more “technical” than Senge. Choo builds on
Senge’s ideas as well as those of others, but is more detailed and structured, and proffers a holistic model of learning organizations. His model includes modes of knowing—sense making, knowledge creating, and decision-making—which organizations (and individuals, groups, etc.) employ as appropriate to the circumstances, converting explicit knowledge to tacit knowledge, and back again. Choo identifies cognitive, affective, and situational dimensions that vary with mode and with knowledge conversion. In place of Senge’s shared vision, Choo looks for “shared mind”: ability to learn together, evident in the organization’s culture and the ways in which it’s members reach—or don’t reach—consensus.

Davenport and Prusak (1998) begin with a working definition of knowledge—a taxonomy, really. Information is “data that makes a difference” (p. 3), Davenport and Prusak (1998) tell us, and “knowledge derives from minds at work” processing information (p. 5). Davenport and Prusak parallel Choo’s modes with a process that generates, codifies and coordinates, and transfers knowledge. In Davenport and Prusak’s model, each step in the process involves different roles and skills, which are rather more observable than Choo’s affective, cognitive, and situational variables. Davenport and Prusak repackage Senge’s disciplines as critical activities for organizational learning, each of which contributes to the efficacy of processing data into information into knowledge.

Collins (2001) presents an empirically-derived model that also essentially extends Senge’s (2006) concepts of mastery and feedback into a process for organizational transformation. Unlike Choo’s (1998) knowing cycle, Davenport and Prusak’s knowledge process, or intellectual capital’s foci and timeframes of knowledge (Stewart, 1997; Edvinsson & Malone, 1997), Collins’ “Good to Great” model is developmental. Collins sees the process occurring over a relatively long time. Organizations gain capabilities by engaging the “right”
people, getting them to think together, and to act collectively. The Good-to-Great development process is driven by iterations of a “council” asking questions, dialoging and debating, making decisions, and analyzing the results of those decisions. This iterative process is practically a hybrid of Shewart’s plan-do-check-act cycle (Deming, 1986), Kolb’s (1984) experiential learning model, and van der Spek and Spijkervet’s (1997) knowledge activities, as well as Boisot’s (1995) information space, and Choo’s (1998) modes. It is notable that Deming and Kolb both also promoted active involvement of those closest to the work.

A somewhat different approach, which focuses on organizations’ attractiveness to highly capable individuals, is Gratton’s (2007) Hot Spot model. She characterizes attractiveness as a function of cooperative mindset, boundary spanning, igniting purpose, and productive capacity within the organization, each of which is developed through iterative processes similar to Argyris and Schön’s (1978), Senge’s (2006), and Collin’s (2001). Her parallel to Boisot’s (1995) information space and Stewart’s knowledge forms/states is a matrix of a relationship’s depth (strength) to its boundary spanning. Different combinations of span and strength allow different strategies for creating hotspots. Novel combinations of people, exploitation of shared expertise, and exploration via synthesis are social, intellectual, and emotional drivers of human capital. This is a variation of March’s (1991) concept of exploiting versus exploring technologies, as well as Stewart’s (1997) model for dealing with various types of knowledge.

Community in Organizational Learning

The concept of community plays a central role in organizational learning, particularly highly social approaches, such as those of Gozdz (1995), Penuel and Roschelle (1999), Wenger, McDermott, and Snyder (2002), Voosen and Conneely (2005), and Wenger, Trayner, and de
Laat (2011). In this literature, community is something that exists within organizations—“a group of individuals with some common interests and greater density of communication within than across its boundaries” (Markus, 1990, p. 194), rather than a geographically situated phenomenon (Hillery, 1955, 1958; Fischer, et al., 1977; Fischer 1982). And, the focus is practical, so theory is implicit rather than explicit; the theoretical essence is that community is the means of learning.

The contributors to Gozdz (1995) offer a wide range of perspectives on community in organizations, but the overall message is, “Community in organizations is essential for optimal performance and learning capability. Without it we cannot create aligned organizations that coherently work toward shared goals and objectives” (p. 415). The need for community arises from the nature of knowledge, according to Wenger, McDermott, and Snyder (2002), “that it is not an object that can be stored, owned, and moved like a piece of equipment or a document. ... Companies must manage their knowledge in ways that do not merely reduce it to an object” (p. 11).

From cognitive science, Penuel and Roschelle (1999) conclude that practical knowledge develops in communities by solving a variety of problems, particularly in novel situations, based on prior learning, enabled by collaboration, and guided by reflection. Voosen and Conneely (2005) present learning communities as facilitated and supported teams of learners focused on creating new, tacit knowledge to solve ill-formed problems. Senge and Scharmer (2006) see learning community as “a diverse group of people working together to nurture and sustain a knowledge-creating system” (p. 197, emphasis in original) that involves three complementary domains of action: research, capacity-building, and practice. This requires guiding ideas, infrastructure, and common work.
Learning communities are especially prevalent in academic settings. Hord (1997) notes that the term was common in educational lexicon, although it had no clear definition—the community could be educators, administrators, students, parents, external stakeholders, or some combination of these. The concept was refined into *community of inquiry*, focusing on students and teachers learning together, especially in the context of online and blended learning environments. Garrison, Anderson, and Archer (2000) suggest that an educational experience is defined by cognitive, social, and teaching presence, so the question becomes how to maximize those things online. The authors see practical inquiry, which they see as a process of shared perception, deliberation, conception, and action, as the basis for building communities of inquiry. Friedman (2006) discusses how scholarship might be extended via communities of inquiry within communities of practice that include both researchers and practitioners. But Rourke and Kanuka (2009) find problems with construct validity, means for measuring learning, and, more fundamentally, learning outcomes from communities of inquiry. In particular, they question the concept of cognitive presence, finding that it does not emerge in online communities of inquiry. Interestingly, the model of practical inquiry suggested by Garrison, Anderson, and Archer (2000) is very similar to cyclic loops of learning, discussed below. But the extent of these activities and the extent to which they are shared do not seem to be important factors in the communities of inquiry research.

Wenger, Trayner, and de Laat (2011) view “community and network as two aspects of social structures in which learning takes place” (p. 9). Networks are defined by connections and flows, according to Wenger, Trayner, and de Laat, communities are defined by shared identity and collective intentions. Connections, flows, shared identity, and collective are all learning resources. Noise, spontaneity, and unpredictability are inherent characteristics of communities
and networks, any, and, or all of which can feed or undermine learning. Too strong a collective identity means too little noise and variation, maintain Wenger, Trayner, and de Laat (2011), and too much noise impedes collective identity and interests from emerging:

[C]ommunity creates a social space in which participants can discover and further a learning partnership related to a common domain ... [but community] can become hostage to its history, its established ways of doing things, and the attendant identification with the group. (p. 10)

The learning value of network derives from access to a rich web of information sources offering multiple perspectives and dialogues, responses to queries, and help from others ... Expanding connectivity increases the chance of useful access, but it also increases the level of “noise.” (p. 11)

Wenger, Trayner, and de Laat (2011) say knowledge is collected and sense-making occurs via narratives, collective and individual, as accounts of community/network activities, aspirational narratives that frame community/network success, and the tensions between accounts and aspirations. Value develops through cycles from immediate intrinsic value, through potential value as knowledge capital and applied value as changes in practice to realized value of performance improvement. This parallels the four levels of Kirkpatrick’s (Kirkpatrick & Kirkpatrick, 2006) model of learning, to which Wenger, Trayner, and de Laat (2011) add a fifth level of reframing value to redefine success. Each level has different quantitative indicators of increasing impacts through time and space, and different evaluative/reflective questions and value-creation stories.

Cycles in Organizational Learning

The defining metaphor of organizational learning theory is undoubtedly the loop. An early version of the loop is the Shewart cycle, the plan-do-check/study-act cycle promoted by
Deming (1986; Gabor, 1990) and widely used as the basis for continuous improvement. Deming’s guidance is to apply the cycle iteratively to critical issues, one after another, in a disciplined, data-driven manner. Argyris and Schön (1978) begin with a simple model of how outcomes are linked back to actions via beliefs and feelings, then they add ability to improve action, and finally they note how the linkages might be improved to better align enacted and espoused theories. Thus they add a second loop of learning to learn. Argyris and Schön (1978), the plan-do-check/study-act (Deming, 1986; Gabor,1990), and the Lean Startup (Ries, 2011) are similarly structured, but operate at different scales, allowing for loops to be embedded in each other. According to Lindsley, Brass, and Thomas (1995), spiraling loops of perceived efficacy and performance link individuals, groups, and organizations, but have different characteristics at different levels: higher level spirals of efficacy and performance seem to be harder to start and stop, downward spirals are more evident than upward spirals, and higher level spirals may interfere with or mask lower levels spirals.

There are numerous larger-scale process models of organizational learning. Crossan, Lane, and White (1999) see intuiting, interpreting, integrating, and institutionalizing as comprising organizational learning, and connecting action and improvement at individual, group, and organizational levels. Choo’s (1998), Davenport and Prusak’s (1998), Collins’ (2001), and Gratton’s models all share features with Crossan, Lane, and White. At more general level are Simon’s (1976) model of decision-making, Weick’s (1995) sense-making, and Williamson’s (1981) transaction costs, and Wenger, Trayner, and de Laat’s (2011) value-creation cycles. Focused, smaller-scale processes, such as action learning (Revans, 1998; Kramer, 2008), appreciative inquiry (Cooperrider & Whitney, 2005), and Peters’ (2009) DATA-DATA model, are also similar. The common features are a series of general actions each of which involves
information and feeds into the next action, culminating in increased capabilities and reduced uncertainty. Each action or phase in each cycle involves a different set of rules, roles, and resources—different knowledge bases—applied to the evolving issue. And, the process is applied iteratively.

A central theoretical question is whether these models are positive statements about what is or normative statements about what should be. Are they suggestions about how organizations should be structured in order to learn? Or, are organizations that learn necessarily based on such cycles? A related issue is the structure of the “loops”: Does each loop consist of distinct phases? How do the phases interrelate; are they invariably linear and sequential? If the phases vary, how and why do they do so? The literature reviewed above tells us that there is at least a contemplative state and an experiential state—seeing and doing—that translate into active and reflective phases. It also tells us that such simplistic dualities are unrealistic. Action and reflection are generalities that are never realized in the extreme; we—collectively and individually—are always operating with both. Sometimes we are highly active, unselfconsciously attending to and through others. Other times we are deeply reflective, totally engrossed in self, not really doing anything. But, most of the time we are acting and reflecting, interacting and conversing, in a state between the two extremes of self- and other-orientation. This fusion is practically and simply captured in Toyota’s 14th quality principle: “Become a learning organization through relentless reflection (hansei) and continuous improvement (kaizen)” (Liker, 2004, 40).
Regional Learning

The literature reviewed up to this point has not explicitly addressed a fundamental issue: location. People congregate in places, and places become associated with particular activities and products. The concept of geographic regions as containers of knowledge is as old as the social sciences, going back to classic economics’ attempt to explain why some locations are rich and others poor: Smith’s seminal *Inquiry into the Nature and Causes of the Wealth of Nations* (1776/1904), and Ricardo’s theory of comparative advantage (1817). Marshall advanced the concept with his consideration of industrial districts, emphasizing the importance of proximity and environmental factors (Asheim, 2003).

The fundamental question became why some economic activities tend to agglomerate, or congregate in and around a particular location, rather than spread out in space. The general answer is that agglomeration somehow provides an advantage. “The original rationale for industrial districts rests on the creation of … economies that are external to the firm but internal to the area, for groups of small firms … [that] … provides a competitive alternative to the internal economies of scale of large firms” (Asheim, 2003, p. 415). Agglomeration allows for knowledge spillovers from firms and institutions to those around them, but it can also lead to technological lock-in and path dependency in which the economic fate of a region is tied to the lifecycle of its industry, from boom to bust (Audretsch, 1998).

While Marshall is considered the father of neoclassical economics, the field largely ignored his interest in agglomeration (Asheim, 2003). Neoclassical economics did not account for how and why industrial districts blossomed, prospered, and declined. Regions were eclipsed during the mid-twentieth century as nations launched large-scale science programs, but economic restructuring and failure to produce market winners undermined this approach by the end of the
century (Cooke and Morgan, 1998; Cooke, 2002). Schumpeter (1976/1942) provided the basis for a solution to the theoretical and programmatic shortcomings of neoclassical economics with insights into how entrepreneurs foster “creative destruction” by bringing innovative products into the marketplace (Cooke, 2002). Innovation requires resources beyond those readily available to the entrepreneur, thus they face transaction costs finding resources (including knowledge), executing contracts, and coordinating work (Williamson, 1981).

Propinquity reduces transaction costs, allowing firms to be smaller and more specialized. Thus, “much of the competitive advantage lies outside a given company or even outside its industry, residing instead in the location of its business units” (Porter, 2003, p. 254, emphasis in original). The rise and fall of regions may be understood by replacing the term “competitive advantage” in this quote with the word “knowledge.” The unique availability of a full range of specialized knowledge makes regions economically important.

Marshall emphasizes in particular the mutual knowledge and trust that reduces transaction costs in the local production system; the industrial atmosphere which facilitates the generation and transfer of skills and qualifications of workforce required by local industry; and the effect of both these aspects in promoting (incremental) innovations and innovation diffusion among small firms in industrial districts. (Asheim, 2003, pp. 415-416)

Many commentators maintain that improvements in communication should reduce the rationale for agglomeration (Cairncross, 2001). Others point out that this has not happened because collective assets and capabilities, transfer of tacit knowledge, and the very acts of creating knowledge and innovating require propinquity (Calhoun, 1998; Brown and Duguid, 2002; Boschma, 2005; Cooke and Leysdesdorff, 2005).
Interest in agglomeration reemerged in the late twentieth-century. This interest was fueled by research documenting the role that the production of information and knowledge plays in our society (Machlup, 1962; Porat, 1977). Interest in agglomeration was informed by new appreciation of the roles of institutions and knowledge in economic theory (Williamson, 2000; Cortright, 2001). An emphasis on innovation by business thought leaders (Drucker, 1985, 2002/1985) made agglomeration a practical matter. Those who resurrected agglomeration emphasize the integration of the social and economic. These scholars point to complementary public and private roles, and to balance between competition and cooperation, as important in agglomeration. There is division of labor (specialization) among numerous small firms, broad and rapid dissemination of information, and a highly skilled workforce. Agglomerating involves increasing importance of continual, radical innovations, and collective cognizance of a globalizing economy. It requires learning, most of all (Asheim, 2003). Piore and Sabel (1984) see the integration of community life with productive activities as the means by which networks of firms maintain collective assets and continually innovate. As Asheim (2003) puts it:

In a learning economy, the competitive advantage of firms and regions is based on innovation, interactive learning processes. … [O]ne problematic aspect of the learning economy has been its focus on ‘catching up’ learning based on incremental innovations, and not radical innovations requiring the creation of new knowledge. (pp. 426-427)

The concept of “learning regions” was proposed to explain how agglomeration fosters continual and radical innovations, and to illuminate modern issues related to globalization, knowledge-intensive enterprises, and technological change (Florida, 1995). Amin (2008) and other scholars (Tolliday & Zeitlin, 1992; Burrows, Gilbert & Pollert, 1992) contrast these socioeconomic phenomena with large-scale, standardized production that they refer to as
Fordism, in reference to industrial approaches popularized by automotive magnate Henry Ford. In a global, post-Fordist, innovation-oriented economy, regions matter more than ever because “regions themselves are becoming focal points of knowledge-creation and learning … [that] function as collectors and repositories of knowledge and ideas, providing an underlying environment or infrastructure that facilitates the flow of knowledge, ideas, and learning” (Florida, 1995, p. 528). Florida goes on to say:

Learning regions provide the crucial inputs for knowledge-intensive economic organization to flourish: a manufacturing infrastructure of interconnected vendors and suppliers; a human infrastructure that can produce knowledge workers, facilitates the development of a team orientation, and which is organized around life-long learning; a physical and communication infrastructure which facilitates and supports constant sharing of information, electronic exchange of data and information, just-in-time delivery of goods and services, and integration into the global economy; and capital allocation and industrial governance systems attend to the needs of knowledge-intensive organizations. (p. 534)

The challenges for firms, Florida (1995) maintains, are to “adopt new organizational and management systems that harness knowledge and intelligence,” to maintain “a balance between cutting edge innovation and high-quality and efficient production,” “to spur individual genius and creativity … and the collective mobilization of knowledge,” and “to build integrated and dense global webs of innovation and production” (p. 534). All of which implies a shift away from “the increasingly dysfunctional Fordist model” to sustainable advantage based on “continuous improvement of technology, continuous development of human resources, the use of clean production technology, elimination of waste, and a commitment to continuous environmental improvement” (p. 535). The implication is that firms cannot do these things on their own but require an intellectual, physical, and social environment that enables them to do them collectively: a learning region.
The learning-region paradigm emphasizes the *networks* or *associational* characteristics of a region in which firms are embedded, subsuming individual entrepreneurs and workers to consider how they function together rather than operate independently (Granovetter, 1985; Saxenian, 1994; Morgan, 1997). Various forms of proximity—cognitive, organizational, social, institutional, and geographical—provide stability and enable interactive learning (Boschma, 2005), but excessive stability and static interactions resulting from “institutional thickness” can impede innovation (Amin and Thrift, 1995; Hauser, Tappeiner & Walde, 2007). Dynamic social networks with abundant weak ties within regions allow for knowledge spillovers and new opportunities for interactive learning. Broader extra-local networks bring new capabilities, ideas, and technologies into regions (MacKinnon, Cumbers, and Chapman, 2002). Both types of ties reduce transaction costs for knowledge as well as other resources, contributing to innovation by making it easy to connect disparate chunks of information into usable and useful knowledge.

Embeddedness must be balanced by autonomy. If it is not, regions can get locked into a particular technology, following it from boom to bust. “It is the type of network relationships between organizations (firms, institutions) rather than their spatial clustering alone that determines the ability of regions to adapt” (Boschma and Lambooy, 1999, p. 393). Dynamism in social networks—lots of weak ties and shifting relationships—allows clusters (or the communities or regions in which they operate) to diversify, reinvent and revitalize themselves, and avoid technologically-determined path-dependency. Stronger, more stable ties provide governance, particularly to and through institutions, and reduce uncertainty, making it more practical for actors to take risks (Morgan, 1997).

Some regional-learning literature, particularly prior to Florida’s explication of the concept, extends resource-based theories of organizations to explain why firms cluster together
by industry (see, for example, Porter, 1990). Breznitz and Taylor (2010) contrast such factor-oriented theoretical perspectives with others that focus on social structure of regions, such as the dynamics of the “triple helix” of academia, government, and industry (Etzkowitz and Leydesdorff, 1997; Etzkowitz, 2008) and an interactive model of innovation (Morgan, 1997).

Cooke (2002) suggests that regional learning is essentially collaborative economic action by a localized socioeconomic system in response to natural socioeconomic disequilibrium. This requires social connections that are dynamic yet resilient: “knowledge is in the network,” Cooke (2002) maintains, “because each move in the interactive innovation process requires learning from other than those involved in the preceding move” (pp. 2–3, emphasis in the original).

Breznitz and Taylor (2010) conclude that social structure is as important for innovation as economic factors, and more important to growing and retaining producers of technological innovations.

The triple-helix theory (Etzkowitz & Leydesdorff, 1997; Etzkowitz, 2008) posits that a general type of social-network structure must exist for regional learning, and evolves in a particular way to sustain innovation. Generally, Etzkowitz (2008) maintains, triple-helix regional learning emerges as the distinction between business and science is blurred, and as government facilitates this blurring with resources and regulatory relief. Civil society and voluntary associations provide the space for the helices to connect and overlap. “A triple helix regime typically begins as university, industry, and government enter into a reciprocal relationship with each other in which each attempts to enhance the performance of the other” (Etzkowitz, 2008, p. 8). As industries become more knowledge-intensive, government and university play more important roles as enablers. The triple helix evolves as each strand—academia, government, or industry—takes on new roles similar to the roles of the others in
support of the others’ core competencies, as each strives to make the others successful. Performance of each helix improves as individuals and information circulate through it, and individuals and information circulating between the helices fuels innovation.

Innovation is an interactive learning process, says Morgan (1997), with powerful feedback loops incorporating common and tacit knowledge, “that is shaped by a variety of institutional routines and social conventions” (Morgan, 1997, p. 493). Agglomeration, or clusters of complementary specialized entities in proximity and cooperating with each other, is a hallmark of learning regions. But the clusters are byproducts of the innovation process, of social propagation of knowledge from individuals to community, and of mobility within the region between firms (Cooke, 2002). These are made possible in turn by norms of reciprocity and trust—social capital—that facilitate network development, support interactive learning and innovation, and thereby provide competitive advantage. Cook maintains that “[C]lustering [exists] for learning, knowledge transfer, collaboration, and the exploitation of spillovers” (p. 3). The “innovation as interactive learning” theory further explicates and supports the “evolving triple helix as source of sustained radical innovation” theory: The triple helix provides the institutional infrastructure for interactive learning, and interactive learning provides the means by which the triple helix evolves.

Moulaert and Sekia (2003) examine various “territorial innovation models” of regional learning. They find that each includes agglomeration, endogenous development, and systems of innovation. Each model also includes evolution and learning, network organization, and governance. But Moulaert and Sekia feel that these models suffer from theoretical ambiguity as a consequence of excessive focus on business culture and technological innovation. They suggest an “integrated area development” model that includes non-market components of the economy.
and community life “to broaden the discussion on territorial innovation in all its dimensions, as a lead theme for the progress of humanity at the local level” (p. 299).

MacKinnon, Cumbers, and Chapman (2002) fault regional-learning scholars for not fully considering the importance of extra-local ties in fostering innovation. Doloreux and Parto (2005) … contend that the interactions between actors in regional innovation systems have not been sufficiently explored, while the institutional context of these interactions has been largely overlooked. As a result, the validity of recommendations for innovation policy making based on the current analyses of regional innovation systems is somewhat questionable. (p. 134)

But, by reviewing the literature we can see that Doloreux and Parto’s contentions are not justified, as I now show.

Brown and Duguid (2002) maintain that the only means of constructing regional advantage is to capitalize on local knowledge that is simultaneously “leaky” and “sticky.” Such knowledge inevitably leaks out of particular organizations but sticks in a particular region because it inheres to an embedded boundary, spanning local social networks. Also consider what may be called “optimal proximity,” presented by Boschma (2005): a loosely coupled system, balancing local “buzz” with extra-local linkages, combining community and market relations, and providing institutional checks and balances, to create a common knowledge base with diverse but complementary capabilities. This involves cognitive, organizational, social, and institutional capabilities across and within geographical limits. Brown and Duguid (2002) and Boschma (2005) make essentially the same point: Sustained innovation capacity comes from leveraging unique local human assets for acquiring relevant global human assets and constantly recombining them. These perspectives are essentially elaborations on Marshall (Asheim, 2003), Piore and Sabel (1984), and others.
In the same ways that interactive learning enables firms to generate marketable innovations, case studies have shown that interactive learning by policy makers (Hassink, 2005) and boundary spanning by civic organizations (Safford, 2009) can be important for regions to recover from path dependency and revitalize. Cooke and Leysdesdorff (2005) maintain that regions provide “constructed advantage”—as opposed to comparative and competitive advantages—by intentionally aligning and integrating the regional economy, governance, knowledge infrastructure, and community and culture. Constructed advantage involves combining symbolic/creative, synthetic/technical, and analytic/scientific forms, linking the subsystems for knowledge creation, exploration, and exploitation, enabled by the triple helix. Gertler and Wolfe (2004) look at regional foresight exercises as interactive learning by individuals, organizations, and regions that allow them to adapt and innovate. Such broad-based collective learning can overcome the barriers to learning intrinsic to capitalism. Cross-sector interactive learning allows for the creation of the entirely new organizations necessary for the creative forgetting and unlearning by organizations and social systems. It leads to deep regional economic restructuring (Johnson, 1992; Hudson, 1999; Boschma and Lambooy, 1999).

A new kind of organisation is spearheading the phenomenon: knowledge-based communities, i.e. networks of individuals striving, first and foremost, to produce and circulate new knowledge and working for different, even rival, organisations. One sign that a knowledge-based economy is developing can be seen when such individuals penetrate conventional organisations to which their continuing attachment to an “external” knowledge-based community represents a valuable asset. As these communities develop their activities, they become agents of change for the economy as a whole. (David & Foray, 2002, p. 9)

A knowledge-intensive community is a community where a large proportion of members is involved in the production and reproduction of knowledge and, hence, the creation of a public (or semi-public) space where knowledge is circulated and where codification and dissemination
costs have been radically reduced through the use of new information and communication technologies. (David & Foray, 2002, p. 14)

Core Concepts

This section builds on and extends the concepts and definitions embedded in the literature review, above. My focus here is on terms that are central to theories of learning, particularly those that I anticipate using in my proposed theory, and especially those that I use somewhat differently than is typical. My goal here is to clarify and validate my definitions of the terms as a basis for the results section of my dissertation.

Learning. The key term in this proposed dissertation is learning. Schunk (2008) begins his comprehensive survey of theories of individual learning by defining learning as “an enduring change in behavior, or in the capacity to behave in a given fashion, which results from practice or other forms of experience” (p. 2). Note that the essence of learning for Schunk is a change, where the standard definition of learning is simply “the act or process of acquiring knowledge or skill” (learning, n.d.). Theory is implicit in both. For Schunk the essential theory is that “practice or other forms of experience” results in “an enduring change in behavior, or in the capacity to behave in a given fashion” (p. 2). The standard definition theorizes that “knowledge or skill” is acquired via an “act or process.” Together these definitions make learning both an act—or series of activities (a process)—and the result of that act; it is both a change in behavioral capacity and acquisition of knowledge or skill, which are presumable demonstrable.

Acting and behaving are both important to learning; what’s the difference? To act is “to do something, to exert energy or force” (act, n.d.), generally to benefit or perpetuate the actor, whereas behavior is a pattern of interactions in the social context of mores, norms, and values. As noted in the philosophy of action (Wilson & Shpall, 2012), action implies agency,
consciousness, intention, and mind. Action has meaning to the actor(s), others attribute meaning to the actions/actors, and actors shape their actions to affect meaning (Weber, 1922/1978); Thus, action becomes behavior. Action or behavior without agency is simply an effect of gravity, thermodynamics, or other laws of nature. These definitions do not venture to say that learning is an improvement, though—only a change. Next, I argue that learning is necessarily a beneficial change, or increase in capabilities.

Capability and knowledge. Undergirding the definition of learning are two essential terms: capability and knowledge. The dictionary definition of capability refers to “ability or capacity” (capable, n.d.), but I use the term to mean the combination of the two: ability given capacity, where capacity is the quantity that can be accommodated or carried, and ability refers to the quality of accomplishments from using capacity. Capability is both the know-how and the resources to act (Sen, 1988, 1999; Nussbaum, 2000; Clark, 2005). Knowledge is informed true belief; something that one accepts as real or true, based on reasoning from sense data, that is actually real or true. This definition is derived from Plato (Meno, The Republic, and Theaetetus), who refers to knowledge as justified true belief. Using the term “informed” rather than “justified” avoids the problems of justification (Gettier, 1963; Chisholm, 1982), and provides practical criteria for knowing by substituting information for justification. Shannon and Weaver (1949) define information as a probabilistic measure of uncertainty, or simply something that reduces uncertainty. So, essentially, knowledge is content of the mind derived from the senses, even if indirectly via reason, that is coherent, consistent, and correspondent. One can increase the quantity or scope of one’s informed true beliefs, or one’s existing beliefs can become better informed and more true. Either way, an increase in knowledge improves one’s capabilities to act.
Belief. For the purpose of this dissertation, belief is simply defined as contents of mind, which is consonant with the standard definition (belief, n.d.). Fishbein and Ajzen (1975) say that, “beliefs refer to a person’s subjective probability judgments concerning some discriminable aspect of his world; they deal with a person’s understanding of himself and his environment” (p. 131). For every belief there is an object that the belief is about, a relationship, a second object or characteristic or outcome, and a probability associated with that relationship. Belief that a thing exists—belief in—is simply a fundamental form of belief about. Beliefs can arise from direct observation, which Fishbein and Ajzen (1975) refer to as descriptive beliefs, or can be inferred from past experience, from logic, and socially promulgated associations. Experience creates a “residue” of beliefs according to Fishbein and Ajzen (1975), which is critical to inference:

It is thus possible to view beliefs as representing a continuum from descriptive to inferential. At the descriptive end of the continuum, a person’s beliefs are directly tied to the stimulus situation, and at the inferential end, beliefs are formed on the basis of these stimuli as well as residues of the person’s past experiences; the continuum may be seen as involving minimal to maximal use of such experiential residues. (p. 133)

So, belief can be defined formally in terms of the relationship between to objects or qualities, the subjective probability assigned to the relationship, and the extent to which the belief draws on prior experience—it is new content of the mind or built upon existing content.

Knowledge has verisimilitude (Popper, 1963/2003) when it is coherent, consistent, and correspondent. These are the criteria for true knowledge. Coherent knowledge is clear, sensible, and has well-integrated components (i.e., propositions) that do not contradict each other (Young, 2008). Consistent knowledge—based on Habermas (1979, 1984) and the pragmatists, Dewey (1910/1991, 1929/1984; Hickman & Alexander, 1999), James (1907/1975), and Peirce (Peirce, Hartshorne, & Weiss, 1935)—is invariably expressed and experienced, particularly via narrative
and practice. Correspondent knowledge accurately represents some aspect of reality (David, 2009). While these definitions can be seen as competing philosophical views of truth, they can also be seen as complementary criteria for true knowledge, i.e., true knowledge must meet all three criteria to have maximum verisimilitude, to be considered “most true.”

Ryle (1946, 1949) makes the distinction between knowing-that and knowing-how. There is a huge difference between “acknowledging principles in thought and intelligently applying them in action” (1946, p. 8). Principles may explain and guide action but one does not need to know the principles to act, and “Knowing a rule is not knowing how” (1946, p. 7). Knowing-that involves putative facts or truths, while knowing-how often occurs without conscious theorizing. In fact, action and experience precede and inform as well as validate fact and theory, Ryle insists. It is not the declaration that makes the action possible, rather the other way around. Of course, the action may be observed rather than experienced directly, particularly when actions are particularly dangerous, but that is a weaker form of knowing-how. Ryle built on previous philosophers, particularly Russell (1911), who argued that true knowledge involved firsthand experience (knowledge by acquaintance), and that knowledge by description (know-of) was a lesser form of knowing.

Ryle’s ideas can be seen in Bandura’s social cognitive theory, particularly learning by observing versus learning by doing (Bandura, 1986), and in the distinction between moral competence and moral performance (Bandura, 2001). Ryle is also reflected in How People Learn (Bransford, Brown & Cocking, 2000), which reports that experts’ knowledge can’t be reduced to a set of facts or rules; they can retrieve specialized knowledge with little effort, but may be incapable of teaching others. Essentially, there is an ineffable, non-codifiable knowledge of procedures that comes with experience. This knowledge enables statements about what is real or
true, but those statements can only be tested, validated, and verified by application, which may require expertise from repeated application (i.e., just because something doesn’t work the first time you try it, doesn’t mean it’s wrong, it just means you’re doing it wrong and you have to try it again and do it right).

Polanyi (1958, 1966) extends Ryle’s distinction to explicit and tacit knowledge, distinguishing between knowledge that can be codified and easily transferred and knowledge that can be shared only through interaction. All knowledge, Polanyi notes, is based on personal judgment and is consequently subjective. Both Polanyi and Ryle reject the Cartesian dualism between mind and body. Polanyi, particularly, explores how we can indwell an object, attend through it—rather than to it—to something else, essentially integrating mind and body. For Polanyi, knowing and doing are integrated into being (similar to, but distinct from Heidegger’s approach (Capobianco, 2010)). Interestingly, Polanyi’s work seems to have had more impact on organizational learning, where there is interest in generating and monetizing knowledge, than on education (as recent examples: Pfeffer and Sutton, 2000; Lam, 2000; Bennet and Bennet, 2008; Busch, 2008; Nonaka and von Krogh, 2009).

Just as Ryles and Polanyi rejected Cartesian mind-body dualism, so did Heidegger (Capobianco, 2010) and Habermas (1979, 1984) reject the object-subject distinction. For Heidegger, this dualism disappears in being. Habermas (1979, 1984) made the point that each action or utterance is embedded in the intersubjective, the world of ideas, language, and values that has been constructed and is reconstructed by human interaction. Habermas maintains that statements can only be valid if they are consistent with the objective “it,” the subjective “I,” and the intersubjective “we.” Habermas suggests that the rational is established via communication, that language serves as the means for connecting doing to knowing, for translating implicit
know-how into explicit know-that and using know-that to inform know-how. To be considered fully rational, any action/thought/expression must be seen as normatively (intersubjective), objectively, and subjectively valid to all involved: It must be true (“it”), right (“we”), and sincere (“I’’). Valid knowledge—and consequent actions and expressions—corresponds with what is objectively considered real, consists of intersubjectively defined social mores, and coheres with one’s subjective believes and experiences.

All of this must be placed in the context of current understanding of reality. Most fundamentally, as already noted, human knowledge and understanding are limited (Plato, The Republic; Descartes, 1641/1998; Simon, 1976, 1991). In the last century we have come to understand that this is not just a limit of the human mind; it is a fundamental aspect of reality. Einstein’s theory of relativity (1920), Heisenberg’s uncertainty principle (1930), Gödel’s incompleteness theorem (1931/2000), and Arrow’s impossibility theorem (1970) show that reality is inherently contingent and uncertain. The result is described by Shannon’s theory of communication (Shannon & Weaver, 1949) in which information is inevitably reduced by entropy and noise. The fundamental uncertainty of nature is evident in chaotic and complex phenomena for which absolutely accurate prediction is impossible, there is self-similarity or recursion across scale, and small causes can have large effects (Waldrop, 1992; Kelly, 1995; Prigogine, 1997). Individual units can self-organize into unique wholes and new properties can emerge seemingly without cause (Goldstein, 1999; Corning, 2002), particularly among living, self-referential systems (Maturana & Varela, 1980; Luhmann, 1990).

Taken to the social scale, fundamental realities mean that objectivity and rationality must be looked on with skepticism. Heidegger (1927/1996) rejects objectivity. Kuhn (1962/1996) lays bare the process by which scientific paradigms are constructed and supplanted. Lyotard
Habermas (1984) and Giddens (1986) discuss how rationality and social structure are continually redefined as people communicate with each other. We may be certain that causality exists, but the exact levels of cause and effect, and the relations between them, are complex, contingent, and fundamentally uncertain.

In summary, knowledge is informed, true belief, which is manifested as capabilities. Learning is both the outcome and process of gaining capabilities and knowledge. Knowledge can take several complementary forms—know how, know that, etc.—and can be explicit, implicit, or tacit. The criteria for knowledge are coherence, consistence, and correspondence, which comprise trueness or verisimilitude. Validity must be subjective, objective, and intersubjective. The processing of information into knowledge can vary in cognitive efficiency, efficacy, and equity. The outputs of learning can be understood in terms of cognitive metrics, knowledge criteria, forms of knowledge, and validity. All of these thinks are inherently limited and uncertain, and are arbitrarily defined by human interaction. The basic question for the dissertation is about the process and activities that result in learning, and how they relate to individual, organizational, regional, and broader social factors.

Multilevel. Given that the purpose of this dissertation is to provide an explanation and model of learning that spans multiple levels of social aggregation, I really should provide a clear definition of multilevel, including what it means for a model or theory to be multilevel. The literature reviewed here makes it apparent that social theories don’t just accommodate multiple levels of social aggregation; the theories seek to identify the levels, explain why they are distinct from, and help us understand how they relate to, each other. A distinction must be made between classes-collectives-sets and elements-individuals-members, Dubin (1969) tells us, to avoid the
mistakes of assuming the individual mirrors the class or assuming that the collective is simply the sum of its members. “Multilevel models enable the analyst to view people in the context of their social and organizational hierarchies,” say Heck and Thomas (2009):

Because of the presence of these successive grouping, people within particular organizations may share certain properties including work-related beliefs, attitudes, and goals. Similarly, properties of groups may also be influenced by the people in them. (p. 1)

Rousseau (1985) provides basic concepts and issues, beginning with the idea that multilevel implies hierarchical relationships in which higher-level entities are composed of, larger, and more complex than lower-level entities. Higher-level entities are “interdependent, goal directed” collectives, in Morgeson and Hofmann’s (1999) formulation, that emerge from and influence individual action.

The implication is that variation occurs within subjects, at lower levels, as well as between subjects of a given level, and a fundamental question for multilevel theories is how variation within a unit relates to variation between units (Heck & Thomas, 2009). Thus, in multilevel models the focus is on correlation between variance of constructs as much as their values. Generally:

Multilevel theories, thus, begin to bridge the micro-macro divide, integrating the micro domain’s focus on individuals and groups with the macro domain’s focus on individuals and group with the macro domain’s focus on organizations, environment, and strategy. The result is a deeper, richer portrait of organizational life—one that acknowledges the influences of the organizational context on individuals’ actions and perceptions and the influence of individuals’ action and perceptions on the organizational context (Klein, Tosi, & Cannella, 1999, pg. 243, emphasis in original).

This dissertation seeks to take this understanding to another level—literally and figuratively—by considering how regional context influences organizations and individuals, and
vice-versa. In this dissertation, I will refer to individuals and their activities, characteristics, etc., as *micro*, to groups and organizations as *meso*, and to regions as *macro*.

*Community.* The other term that will be important is *community.* The standard definition of the term (community, 2003) involves, “A group of people living in the same locality and under the same government” and “The district or locality in which such a group lives,” but also “A group of people having common interests” and “A group viewed as forming a distinct segment of society” (community, 2003). Tönnies’ (1887/2001) made the seminal distinction between community ties (*Gemeinschaft*), which cause individuals to place others above self, exemplified by family, from the ties of society (*Gesellschaft*), which are based on self-interest. In 1955, Hillery noted ninety-four definitions of the term in sociological literature, and his 1958 seminal consideration of the topic focused on “a social group inhabiting a common territory and having one or more additional common ties” (p. 237).

Arensberg and Kimball (1965) see community as “a master institution or master social system; a key to society; and a model, indeed perhaps the most important model of culture… a main link, perhaps a major determinant, in the connections between culture and society” (p. ix). Sanders (1975) turns this linkage around, saying that community “is part of and acted upon by complex environmental factors” (p. 44). This “setting” includes a community’s ecology, demography, culture, personality, time, and society at large. For a community to prosper, Sanders (1975) suggests that it must:

1. Recruit new members either through birth, in-migration, or annexation, and maintain existing members;
2. Train the new members to play the appropriate roles as they take their places and achieve status in the community;
3. Exert some form of control over individuals who deviate too far from the norm. (p. 192)
These processes are carried forward, Sanders suggests, by two general functions: allocation and communication. The allocation of resources, roles, power and prestige to members of the community provides incentives and disincentives for becoming, staying, or bringing in a member of the community, and for filling certain roles or behaving in certain ways.

Communication is the means by which members or potential members of a community come to know how the community performs allocation—how much of what resources are assigned to which components of the community. Communication allows the community to carry out its processes—recruitment, socialization, and control—by bringing individuals within its boundaries, enhancing their ability to deal with diversity and to prosper, and inform members about those processes.

Social psychologists such as McMillan and Chavez (1986) approach community from an individuals’ perspective. They define community phenomenologically, in terms of the individual’s sense of belonging, influence, needs fulfillment, and shared emotional commitment, which apply—like Arensberg & Kimball’s and Sander’s definitions—to interest-based communities as well as place-based ones. McMillan and Chavez (1986) provide detailed definitions of each aspect of community:

[M]embership has five attributes: boundaries, emotional safety, a sense of belonging and identification, personal investment, and a common symbol system. These attributes work together and contribute to a sense of who is a part of the community and who is not. (p. 11)

Influence is a bidirectional concept. In one direction, there is the notion that for a member to be attracted to a group, he or she must have some influence over what the group does. … On the other hand, cohesiveness is contingent on a group’s ability to influence its members. (p. 11)

[F]or any group to maintain a positive sense of togetherness, the individual-group association must be rewarding for its members. … The extent to which individual values are shared among community members
will determine the ability of a community to organize and prioritize its needs-fulfillment activities. … ¶ … A strong community is able to fit people together so that people meet others’ needs while they meet their own. (p. 12-13)

A shared emotional connection is based, in part, on a shared history. It is not necessary that group members have participated in the history in order to share it, but they must identify with it. The interactions of members in shared events and specific attributes of the events may facilitate or inhibit the strength of the community. (p. 13)

In summary, strong communities are those that offer members positive ways to interact, important events to share and ways to resolve them positively, opportunities to honor members, opportunities to invest in the community, and opportunities to experience spiritual bond among members. (p. 14)

So, community as a concept is strongly associated with, but does not necessarily involve, place. It does, however, link individuals and groups together, and to broader society. Place, as well as interests, is basically means for making that linkage. Community is phenomenon—not a thing—that is evident in interactions between humans (and other living things). The phenomenon is sensed so strongly that it is perceived as a thing. Indeed, this can be seen as a central element of the definition: Community is perceived affective ties among actors.

Conceptually, community is a nexus of human needs-fulfillment activities that is clearly identified and valued as such by participants. Community is evident in the extent to which participants would forego personal benefits in order to establish or sustain this nexus. Morse (2005) introduces the concept of community learning, but implies that community is a thing when he says that, “[c]ommunity learning is collaborative learning that occurs at the community level about community level concerns” (p. 4, emphasis in the original). Morse (2005) provides six postulates about learning as a community-level process:

Postulate I: The community process creates new, collective knowledge in the form of shared meanings or collective ideas. (p. 13)
Postulate II: Structured processes of dialogue and deliberation facilitate the community process. (p. 15)

Postulate III: The community process creates, maintains, or strengthens the relationships which constitute the social structure of community. (p. 19)

Postulate IV: A model of community as the structure of interinstitutional relations focuses the attention of researchers and community participants on the linkages across community institutions and social fields. (p. 20)

Postulate V: Community learning occurs as knowledge created through the community process is fed-forward to the level of the community structure or field. A community has learned when this collective knowledge is institutionalized across the community structure, or rather, is embedded across the web of community institutions. (p. 23-24)

Postulate VI: A “learning community” has a well-developed community structure that has institutionalized the practice of community learning, thus facilitating a sustained community process. Such communities are said to be taking advantage of the “collective intelligence.” They have created ongoing “forums for interaction”, or space for the community process at the level of the community structure or field. (p. 27)

Morse (2005), like other scholars who focus on community, implies that the term community refers to a thing. As things,

Communities are collections of actors whose membership in the collective provides social and cultural resources that shape their actions. Membership can result from a number of factors, including propinquity, interest in a common goal, or common identity. (Marquis, Lounsbury, & Greenwood, 2011, p. xvi)

According to Marquis, Lounsbury, and Greenwood (2011), community is a form of organization for social production of goods and, “a key source of institutional logics that provide meaning and shape behaviour of actors in an institutional field” (p. xvi). For practical purposes, community is “a group of people with diverse characteristics who are linked by social ties, share common perspectives, and engage in joint action in geographical locations or settings” (MacQueen, et al.,
2001, para. 3), recognizing that people emphasize and experience elements of this differently, based on their backgrounds.

An important implication of these definitions is that community exists at and varies across all levels: Individuals each have unique, personal communities. Organizations are not communities, but do have communities embedded within them, and have communities that span their boundaries. And, organizations are members of communities when all members of the organizations involved share a sense of their organizations’ belonging. Regions are not communities but do have communities of individuals and organizations within and across them.

For the purposes of my dissertation, community is not a thing; it is a set of actors that is defined by their interactions, manifesting at all levels in similar but different manners. That said, community manifests as a thing, as a group given substance by members’ behavior, based on shared sense of belonging and commitment. In this dissertation, I use the term community to mean both the phenomenon of shared sense of community and the grouping described by MacQueen, et al. (2001), and make an explicit distinction when I use the term to mean one or the other.

These concepts and definitions provide the footers upon which I hope to lay the foundations for a multilevel theory of learning. These concepts are considered in more detail in chapters four and five. The question is how to explain, to model, and to predict learning, and how we can critique and improve learning. The literature regarding learning reviewed in this dissertation shows commonalities between theories of learning at various levels, but also critical differences. What is conspicuous in its absence is a conceptual framework for linking the levels; a theory that explains how they relate that is consistent with established theory at each level.
How might a theory that applies to multiple levels and to relationships between levels be constructed? In the next chapter I review literature on methods for analyzing concepts presented in texts, which I use to identify commonalities and differences in learning across/between levels, literature on methods for generating scientific theory, and literature on multilevel models. Then, in chapter four, I present the results of my application of these methods to the question of how learning occurs at various levels of socioeconomic aggregation.
CHAPTER III

METHODOLOGY

As discussed at the outset, my goal for this dissertation is to synthesize a theory of learning at all levels of socioeconomic aggregation. The theory should help us understand interactions across, between, and within levels in order to predict and improve learning at all levels. There are three general tasks that I propose to carry out in order to suggest such a theory. The first task is to identify a theoretical gap: a discrepancy in explanations of how learning—the process of increasing capabilities or knowledge—occurs. Essentially, for this task, I must analyze ideas related to learning. My concern is not with particular theories, or even academic disciplines, but with the space between them, and with connecting them together. For this task I employ textual analysis (Fairclough, 2003; Flick, 2009). The “data,” so to speak, for this analysis are the ideas and theories from various academic disciplines, included in the review of literature in chapter 2.

The second task for this dissertation is to suggest an explanation of learning that is consonant with the ideas from various academic disciplines. This will be an exercise in theory and model building. Such an exercise can only be considered productive if it results in a conceptual framework that includes constructs and variables for description, measurement, and testing. Therefore, I provide a conceptual framework that accommodates both qualitative and quantitative inquiry into the nature of learning, and that can be used by various academic disciplines. In order to accomplish this, my conceptual framework must be different enough to
extend existing concepts without being so different that it conflicts with existing ideas. Essentially, my challenge is to establish a “Switzerland” that is not within any one discipline or paradigm, but is a place for the academics (and practitioners) to meet and work together. The “Results” section of this dissertation will accomplish this second task.

The third and final task, which is essentially an extension of the second, is to describe how the models I suggest might be used, how they might be applied in practice, how they might be tested, and, generally, the means by which they might help us understand, predict, improve, and explain learning across levels of social aggregation. To accomplish this I provide a mental simulation or thought experiment of the use of my conceptual framework, models, and putative theory. I use narrative form for this purpose, telling a story about practitioners and scientists working together to address learning across levels. This will be done in the final chapter of this dissertation.

Textual Analysis, Narrative Inquiry, and Critical Discourse Analysis

The initial method of this inquiry is a form of objective hermeneutics akin to narrative inquiry (Clandinin & Connelly, 2000). It takes theories of learning as parts and products of the process of mimesis—the representation of reality—and considers what unifies and differentiates them. My method is to act as a medium for a dialogue within and between these bodies of literature, extending the philosophical hermeneutics of Gadamer (1960/2004) as discussed by McDowell (1994; Ramberg & Gjesdal, 2009). This dissertation is part and product of my Bildung, which McDowell (1994) defines as the development of one’s second nature, as well as an interpretation of the mimetic processes implicit in bodies of theoretical literature regarding how individuals, organizations, and regions learn.
Building on Schütz (1962), as discussed in Flick (2009), my task is third-degree construction: constructs from the theoretical ideas that are derived from actual experience and everyday life. Flick (2009) presents mimesis as the process of constructing versions of the world from experience, and interpreting those versions to guide action. This is second-degree construction, where social construction of reality (Berger & Luckman, 1966) is first-degree. My task here is to look across academic disciplines to understand commonalities and differences in their constructions of learning. In pursuing this task I borrow from, build on, and respond to Fairclough’s (2003) point that:

There is a need to develop approaches to text analysis through a **transdisciplinary** dialogue with perspectives on language and discourse within social theory and research in order to develop our capacity to analyse texts as elements in social processes. A ‘transdisciplinary’ approach to theory or analytical method is a matter of working with categories and ‘logic’. (p. 6, emphasis in the original)

Critical discourse analysis is a form of social research, which Fairclough (2003) tells us:

… begins from questions such as these: how do existing societies provide people with possibilities and resources for rich and fulfilling lives, how on the other hand do they deny people these possibilities and resources? What is it about existing societies that produces poverty, privation, misery, and insecurity in people’s lives? What possibilities are there for social change which would reduce these problems and enhance the quality of the lives of human beings? The aim of critical social research is better understanding of how societies work and produce both beneficial and detrimental effects, and how the detrimental effects can be mitigated if not eliminated. (pp. 202-203)

A somewhat unique feature of this dissertation is that I am interested in how the behavioral and social sciences answer these questions and achieve the aims of understanding and improvement. The literature reviewed in Chapter 2 tells us that learning is essential to individuals, organizations, and regions. Learning appears to be a topic for the full range of
behavioral sciences—indeed, for all science, if advancing knowledge is considered to be learning. Given the breadth of this endeavor, I focus on the central ideas from theoretical literature related to learning at the individual, organizational, and regional levels, rather than on the particular language of specific texts.

The initial portion of the results of this dissertation will be an analysis—my interpretation—of the fundamental concepts from each of these bodies of literature. I then apply the methods of theory and model building, discussed below, to suggest an explanation of learning that applies at all levels of social aggregation, and of how learning at various levels is related. The purpose of this form of discussion is to instantiate (Jaccard & Jacoby, 2010) my proposed theory, to validate it, and to further the reader’s understanding of what I am suggesting. Theory and model building are the methods I use to suggest a theory to fill the gaps in the literature reviewed above.

Theory Building

The goal of my dissertation is to propose “a set of statements about the relationship(s) between two or more concepts or constructs” (Jaccard & Jacoby, 2010, p. 28), which is how Jaccard and Jacoby define the term “theory.” In particular, I attempt to advance our understanding of how concepts and constructs at different levels of social aggregation (which is, itself, a construct) relate to each other. I begin with the supposition that a multilevel learning theory must conform to and draw on accepted theory from multiple fields. Indeed, by its very nature such a theory transcends disciplinary boundaries. So, this is a transdisciplinary endeavor.

A multilevel learning theory should also have implications for practice at various levels—individual teaching, organizational development, regional planning, etc. Therefore, this
dissertation is rightfully an applied, practical endeavor, as well as a theoretical one. Because this is bound to be an applied, transdisciplinary theory, it is important to make the theory’s logic abundantly clear and to place it in context meaningful to practitioners (Lynham, 2002; Swanson, 2007). An applied approach, as discussed by Swanson (2007), is methodologically useful because it inevitably draws on and synthesizes from various theories. Ouliaris (2011) maintains that the process of theory building causes critical thinking about phenomena, which guides practice.

With a flexible approach that integrates practice into theory, “Knowledge generation is often best construed as a rhetorical process wherein the nature of knowledge is inextricably tied to assumptions and vocabularies used to communicate ideas and approaches to study” (Gioia & Pitre, 1990, 587). In other words, epistemology matters in practice. Different practices have different paradigms. Gioia and Pitre maintain that paradigms behind theories aren’t totally incommensurable; there are fuzzy boundaries between them. Applied theory building is a “search for comprehensiveness,” for “more complete view or organizational phenomena” (Gioia & Pitre, 1990, 587-588) rather than for truth. But the assumptions, purposes/goals, and rhetoric/vocabulary of paradigms are different, precluding true synthesis (Gioia & Pitre, 1990). Paradigms exist within naturalistic, interpretivist, and critical approaches to social science, and there is similar fuzziness—and even interdependence—between these approaches (Braybrooke, 1987; Lynham, 2002). Effective practice, if not sound science, requires one to rise above paradigmatic dogma.

Science has two separate but not incompatible purposes for theory, according to Dubin (1969): predicting outcomes and understanding interactions—both of which are essential for practice. Others would add emancipation, or at least improvement (Braybrooke, 1987; Gioia &
Pitre, 1990; Lynham, 2002; Swanson, 2007), further tying theory to practice. Regardless of how science is applied, its fundamental objective, Jaccard and Jacoby (2010) maintain, is to achieve consensus regarding methods and results—to achieve intersubjectivity, in Habermas’s (1979, 1984) terms. Weick (1989), quoting Sutherland (1975), defines theory as “an ordered set of assertions about a generic behavior or structure assumed to hold throughout a significantly broad range of specific instances” (p. 517). Jaccard and Jacoby (2010) define theory as “a set of statements about the relationship(s) between two or more concepts or constructs” (p. 28). Gioia and Pitre’s (1990) definition is even simpler: “any coherent description or explanation of observed or experienced phenomenon” (p. 587).

Generally, theories may be constructed deductively, reasoning from general rules to make predictions, or inductively, by generalizing from observations to explain them (Babbie, 2010). The two approaches are also characterized as theory-to-research and research-to-theory (Lynham, 2002). Traditional positivistic scientific method is based on deduction, but Babbie (2010) describes science as a cycle that includes induction, too. The combination drives the cycle from theory to hypotheses to observation to generalizations and back to theory. Dubin (1969) refers to this as the Theory-Research Cycle, in which he identifies four steps of theory building prior to stating and testing propositions: specify units, identify laws of interaction, defining boundaries, and positing possible system states. Ouliaris (2011) maintains that the process of theory building causes critical thinking about phenomena, which guides practice. Applied theorizing requires the addition of practice to the cycle of research and development (Lynham, 2002), which is held together by theory (Swanson, 2007). Lynham argues that the theory-to-research approach is better suited to behavioral and social theory than research-to-theory.
“Good theory” requires considering different phenomena at different scales, drawing on the diversity of human experience, and always putting questions into historical perspective (Mills, 1959). “These temporal and contextual factors set the boundaries of generalizability, and as such constitute the range of theory,” according to Whetten (1989, p. 492), putting the questions of how and what into the context of what, when, where, and, most importantly, why. A substantial theoretical contribution, Whetten (1989) says, should provide theoretical improvements—not just critiques—for multiple aspects of a theory, based on compelling evidence.

To economically answer questions that clarify facts, Mills (1959) maintains, do as much as possible by reasoning, repeating the following four steps: identify relevant information, determine relationships between pieces of information, eliminate the irrelevant, and restate the questions. This is, in Weick’s (1989) terms, “imagination disciplined by the processes of artificial selection” (p. 528), and demands “a more informed and deliberate use of a simulated evolutionary system” (p. 529). An evolutionary approach helps theorists deal with the reality that “most theory construction depends on conjectures, preserved in well-crafted sentences, that are tested in substitute environments by people who have a stake in the outcome of the test and may be tempted to bias that outcome” (p. 529).

The critical ability for theorizing, Mills (1959) says, is “to shift from one perspective to another, and in the process to build up an adequate view of a total society and its components” (p. 232) and “by considering extremes – by thinking of the opposite of that with which you are directly concerned” (p. 235). Weick (1989) maintains that, “A theorizing process characterized by a greater number of diverse conjectures produces better theory than a process characterized by
a smaller number of homogeneous conjectures” and “heterogeneous thought trials are more likely than homogeneous thought trials to solve theoretical problems” (p. 522).

The greater the number of diverse criteria applied to a conjecture, the higher the probability that those conjectures which are selected will result in good theory. Furthermore, selection criteria must be applied consistently or theorists will be left with an assortment of conjectures that are just as fragmentary as those they started with. (p. 523)

The three steps of theory building, identified by Weick (1989), are problem statements, thought trials, and selection criteria. Weick sees this as an intellectual parallel to biological evolution, as sense making rather than problem solving, that does not have discrete well-defined structure: “theory building involves simultaneous parallel processing, not sequential thinking” (Weick, 1989, p. 519). Varian (2009) describes theory building in similar but more practical terms: Look for problems in ordinary experiences that are scientifically interesting, and create the simplest models of agents making choices to explain them. Someone has already done it, Varian warns, and has done it better. Regardless, he promotes simplifying and generalizing by repeated trial-and-error approach. “This back-and-forth iteration in building a model is like sculpting: you are chipping away a little bit here, and a little bit there, hoping to find what's really inside that stubborn block of marble” (Varian, 2009, p. 6).

Jaccard and Jacoby (2010) refer to this process as instantiation, “specifying concrete instances of abstract concepts in order to help clarify their meaning” (p. 76). They note that instantiation bridges the conceptual to the empirical, increasing validity, including intersubjective aspects of empirical methods and results. Researchers maximize shared meaning and reduce surplus (non-shared) meaning as, “each investigator makes his or her conceptual definition explicit … [so] … specific points of agreement and disagreement can be identified”
(Jaccard & Jacoby, 2010, p. 78), which they call consensual validation (as well as intersubjectivity). They place instantiation between generating ideas for theorizing and conducting thought experiments, and suggest numerous heuristics and practical strategies for generating ideas and specifying concepts. “But the meaning and worth of a construct ultimately depends on the broader nomological network in which it is embedded” (Jaccard & Jacoby, 2010, p. 79).

“When theorists apply selection criteria to their conjectures,” Weick (1989) maintains, “they ask whether the conjecture is interesting, obvious, connected, believable, beautiful, or real, in the context of the problems they are trying to solve” (p. 524). Varian (2009) agrees, particularly, that concepts should be interesting. But, as Fiorina (1975) points out, “interesting” depends on current knowledge. The theorist’s judgment of plausibility, based on selection criteria, is parallel to and can substitute for empirical testing, according to Weick (1989). Varian’s (2009) advice is to simplify and generalize, and get to the fundamental idea of the model. This requires additional knowledge: “The more we know, the more restrictions we can place on our models, and the less likely will our models be serious misrepresentations of the empirical world” (Fiorina, 1975, p. 146).

Babbie (2010) says theory building involves establishing a purpose and unit of analysis, identifying variables, including time, and operationalizing them, and conjecturing about the relationship between those variables. And, Lynham (2002) maintains that the process consists of verifying and refining, as well as generating, theory. All four of the research paradigms identified by Gioia and Pitre (1990) seem to have a similar process for theory building, and the cyclic-loop structure: The techniques vary by paradigm, but theory building invariably follows from opening work, data collection, and analysis. And, theory building—particularly for
traditional science—is embedded in a process along with operationalization and observation (Babbie, 2010).

In Dubin’s (1969) view, theories are built of theoretical units (as distinct from, and as determinants of, units of analysis or units of measure)—from most specific to most general: enumerative, associative, relational, statistical, and summative units. The units are either qualitative attributes or quantitative variables that persist over time and are linked by laws of interaction. The general interactions are, from weakest to strongest, categoric (simple association), sequential (related in time), or determinant (one depends on the other) interactions.

Causality involves all of these interactions. Research is “used to measure the values associated with ‘things’” (Dubin, 1969, p. 6) for testing hypotheses about interactions between units, allowing predictions and understanding.

“Concepts are the building blocks for all thinking,” according to Jaccard and Jacoby (2010, p. 11), “It is our concepts that enable us to achieve some basic understanding of the world.” As “generalized abstractions” that “encompass universes of possibilities” (p. 11), constructs are hypothetical yet functional, learned and socially shared, and selectively constructed. Constructs are concepts that encompass clusters of other concepts, note Jaccard and Jacoby, and variables are particularly measurable constructs that represent abstract concepts.

Their general process is to systematically refine concepts, first to constructs, then to variables. Jaccard and Jacoby (2010) suggest identifying outcome variables first, then direct causes, then indirect causes including mediating and moderating variables, and finally reciprocal and spurious relationships, temporal dynamics, and unanalyzed relationships.

Theory building can be seen as a learning process (Scardamalia & Bereiter, 2006), by its structure as well as results (e.g., new knowledge). Just as learning resolves seemingly conflicting
and contradictory sensation, so theories are built via a “generative dance” (Cook & Brown, 1999) between conflicting approaches and incommensurable paradigms. Gioia and Pitre’s (1990) caution about differing assumptions, purposes/goals, and rhetoric/vocabulary is well taken. But the concepts of this dissertation are intrinsically transdisciplinary, and this dissertation must be applied if it is to be sensible. So it is necessary to synthesize from very different concepts if I am to develop a cohesive and comprehensive theory.

The solution is to use paradigmatic differences as a driving force for theory building, as advocated by Mills (1959), Weick (1989), and others. Juxtaposing and jumping between paradigms can be an effective way to generate and select theoretical conjectures, as long as this is done methodically. Another solution is to embrace the fuzziness between approaches/paradigm, and build on their interdependencies by grounding theory in real world context. Such grounding is more than possible, it is essential to applied disciplines because theory connects research, practice, and development in a dynamic cycle that is, again, essentially the same as the loops that are central to organizational learning theory (Swanson, 2007). And, it may be best to start with assumptions, purposes/goals, and rhetoric/vocabulary that are common to all.

While Jaccard and Jacoby (2010) emphasize the importance of theory having consensual validity and relating to other theories, they also promote use of both process- and variable-oriented approaches. “In our experience, science in practice rarely fits neatly into simple dichotomies,” say Jaccard and Jacoby, “Rather, scientists blend approaches in different ways and to different degrees for different problems” (2010, p. 259). They continue:

[W]e believe that one should strive to create a diverse set of tools for one’s theoretical toolbox and then use them in ways that help get the job done. … In the end, the ultimate goal is to describe, predict, understand, and
explain behavior in ways that help us make sense of our world and that allow us to derive benefits. Both confirmatory and emergent approaches are complementary, not conflicting means to these ends. (p. 259)

Fiorina (1975) makes the point that theories, particularly formal models, are inherently limited by simplifying assumptions and could never totally capture reality; there are assumptions built into any theoretical approach. Therefore, Fiorina says, the ultimate criteria for theories have to be the logical rigor of the theorizing and the usefulness theory. The challenge with complex behavioral and social systems, according to Ashby (1970), is to eliminate information: “when faced with the excessively large quantities so readily offered by complex systems, we have to learn how to be skillful in shedding it” (p. 100). Lave and March (1993), say:

A model is a simplified representation of the real world. A model is created by speculating about processes that could have produced observed facts. Models are evaluated in terms of their ability to predict correctly other new facts. (p. 19)

Jaccard and Jacoby (2010), who use “model” and “theory” interchangeably, classify models variously as process-oriented or variable-oriented, as causal or mathematical, and as confirmatory or grounded/emergent. Grounded/emergent theories and process-oriented approaches are similar, although—according to Jaccard and Jacoby’s (2010) description—grounded theories don’t use models. Causal and mathematical models are both variable-oriented approaches. Causal models address mediating, moderating, reciprocal, and other effects. Mathematical models define variables as functions of other variables. Jaccard and Jacoby say these approaches are mostly used in isolation, but argue that causal and mathematical models—confirmatory approaches—could be used together, and even with emergent approaches, to good effect. The authors in Blalock (1985) show how mathematical approaches can be applied to causal models. Others provide philosophical (Tashakkori & Teddlie, 2008) and practical
(Onwuegbuzie, Johnson, & Collins, 2009) guidance and reviews of studies (Small, 2011) that combine process-oriented and variable-oriented approaches to model building.

Fiorina (1975) sees models as expressions of theories, consisting of “primitives” assembled into defined concepts under certain assumptions. Ouliaris (2011) says a model is, “a simplified description of reality, designed to yield hypotheses about economic behavior that can be tested. An important feature of an economic model is that it is necessarily subjective in design because there are no objective measures of economic outcomes” (p. 46). Ouliaris (2011) continues:

Theoretical models seek to derive verifiable implications about economic behavior under the assumption that agents maximize specific objectives subject to constraints that are well defined in the model (for example, an agent’s budget). They provide qualitative answers to specific questions—such as the implications of asymmetric information (when one side to a transaction knows more than the other) or how best to handle market failures. (p. 47)

Formal models are equally useful in political science, Fiorina (1975) tells us: They force the theorist to be more precise, they make assumptions clear (and reasonable), they are easy to validate, and models allow the theorist to dive deep into a theoretical construct. Fiorina admits to the limits of formal models but argues that such models should be judged on their predictive power.

Models can be deductive theoretical models or inductive empirical models that test the theoretical models with data gathered via research (Ouliaris, 2011). Lave and March (1993) identify four general types of social science models—models of adaptation (learning), choice, diffusion, and exchange—and all are built in four steps: (1) observe some facts, (2) look at the facts as the result of some process, (3) deduce other results, and (4) ask whether these results
obtain. Their rule of thumb for model building derives directly from these steps: (1) think “process,” (2) develop interesting implications, and (3) look for generality. Fiorina (1975) suggests “retroduction”—which is similar to Ashby’s (1970) eliminating information, Weick’s (1989) artificial selection, Varian’s (2009) chipping away, and Jaccard and Jacoby’s (2010) instantiation—as a basic approach to model building:

Given some empirical finding(s), X, one poses the question, “How might the world be structured such that X holds, occurs, or is true?” The answers to this question are models, all of which have in common that they assume or imply X. To be worthy of consideration a model must have at least this one tie (X) to the empirical world. (Fiorina, 1975, p. 145)

Generally, models consist of inputs (independent variables), intervening factors, outputs (dependent variables), coefficients that specify the relationship between factors, and an error term for the portion of the relationship that cannot be explained (specified) (Ouliaris, 2011). And, the models must be tested or validated empirically to identify and correct systematic errors. Predictive power and ability to isolate the effects of specific factors tend to be mutually exclusive, Ouliaris tells us, and “the model’s predictions must be tempered by the randomness of the underlying data it seeks to explain and by the validity of the theories used to derive its equations” (2011, p. 49).

Multilevel Models

“Multilevel models enable the analyst to view people in the context of their social and organizational hierarchies,” say Heck and Thomas (2009, p. 1), who provide a thorough consideration of the topic. Multilevel models include a representation of each level and describe relations between and within levels. This allows researchers to consider how variation within a level relates to variation between levels. For this dissertation multilevel modeling means
representing how persons, organizations, and regions learn, and describing how learning at one level affects learning at another level.

A major issue for multilevel modeling is the aggregation and disaggregation of data, and how those data are interpreted:

[I]t is important to develop a scheme to place the explanatory variables hypothesized to affect individual and other types of organizational process in their proper hierarchical locations … This helps to clarify the organizational, or contextual, level to which they rightly belong. (Heck & Thomas, 2009, p. 20)

For this dissertation, I provide a conceptual framework that clearly delineates levels. There are a variety of methods for drawing samples, aggregating data, and analyzing results, the appropriateness of which depends on the type of multilevel model one is using (Klein & Kozlowski, 2000). Researchers must make decisions about constructs and measurements, models, sampling, and analysis, Klein and Kozlowski (2000) note. Multilevel models contain hierarchical data structures, which benefit from techniques that can “represent a number of different statistical concepts including random coefficients, sources of variation in multilevel analyses, missing data, growth trajectories, finite mixtures, and latent classes” (Heck & Thomas, 2009, p. 99). These points are well taken, but such details are beyond the scope of this dissertation. My models will be more general, but I note these admonitions because any multilevel theory should accommodate them to make empirical analysis practical.

Rousseau (1985) notes that the level on which the model focuses is distinct from the levels of measurement and analysis, and it is necessary to avoid attributing what’s measured to another level. Such “misspecification arises from failure to establish specific-level construct validity, which is the extent to which the operationalization the research employs is a valid
measure of a construct at the focal level” (Rousseau, 1985, p. 5, emphasis in original). While aggregation can minimize random error at the level of measurement, according to Rousseau, it cannot help systematic error, and aggregation methods may create spurious relationships in the data. Generally, Rousseau suggests, it is best if the focal unit is consistent with the level of measurement and the level of analysis, and indivisible data for the focal unit is preferable to data aggregated from subunits.

Rousseau (1985) also reminds us to avoid the ecological fallacy of attributing characteristics of one level to its constituents, and the cross-level fallacy of assigning traits at one level to aggregate entities at the next level. Isomorphism, in which a single construct is evident at multiple levels, is an important topic for social science, Rousseau says, “Isomorphism implies that constructs mean the same thing at different levels” (p. 8). It can be difficult for isomorphism to provide non-obvious explanations, Klein, Tosi, and Cannella (1999) note, and clearly define constructs at different levels: constructs’ functionality is the same even though their structure may vary across levels. It is necessary to have a cross-level theory of composition that “specifies functional relationships underlying constructs from different levels” (Klein, Tosi & Cannella, 1999, p. 9, emphasis in original). For example, some researchers have defined constructs at the intrasubjective, intersubjective, and collective levels, while others have examined how constructs change levels (Klein, Tosi & Cannella, 1999).

Rousseau (1985) also tells us to avoid contextual fallacies by considering the effects of environment and setting. Specifically, researchers should mind effects that “act as unit-level moderators of relationships at the individual level” (p. 9) and those that “result from appraisal or evaluation of one’s relative standing in a group” (p. 10). In other word, peoples’ behaviors can be impacted by their situations and their feelings about those situations. Individuals, especially
executives and other leaders, or groups can also affect context and unit constructs (Klein, Tosi & Cannella, 1999).

Rousseau (1985) boils all of this down to three types of models: composition models address how nondependent variables on different levels relate to each other; cross-level models deal with dependent and independent variables at different levels; and, multilevel models are of dependent and independent variables at one level generalized to other levels. Models of composition help ensure that aggregated data represent variables, there is no bias from methods or raters, and the data’s form is valid for a construct’s attributes. Cross-level models can deal with how context impacts variables, relations between multiple variables at the same level, and deviance from in-level norms. Klein and Kozlowski (2000) add that a direct effects cross-level model can only explain between-unit variation. Direct effects can be moderated cross-level by a third variable note Klein and Kozlowski, and within-unit variation can affect variation between subunits (one’s position relative to others may have greater impact than absolute characteristics).

Fully multilevel theories require composition theories to specify how a particular construct exists separately at multiple levels. Klein and Kozlowski (2000) suggest distinguishing between the global, objective characteristics of a group, the characteristics or experiences that are common to all members of the group, and the characteristics that “capture the array, pattern, or variability of individual characteristics within a team” (p. 217). Model builders “must specify the levels or types of organizational units meaningful to us from the perspective of theory development and empirical generalization” (Rousseau, 1985, p. 25). In doing so, it is necessary to be cognizant of assumptions that functions of sub-units depend on their role in higher-level units, and/or that units are derived solely and totally from subunits. There must be between-unit variation just to operationalize the model’s constructs (Klein & Kozwolski, 2000).
Rousseau (1985) provides the following guidelines for multilevel theorizing. Specify the appropriate level(s) for theories, at which levels constructs obtain. Establish construct validity at all appropriate levels. Make sure the number of higher-level units is as large as possible relative to subunits, and make sure subunits are accurately assigned to the correct units. When evaluating independent and dependent variables on the same level, gather data from different subjects. Use global variables whenever possible rather than or along with aggregate data. Evaluate the extent of subjects’ agreement on aggregated measures, but remember that within-unit disagreement may be worth studying (Klein, Tosi & Cannella, 1999) as well as an important consideration in aggregating data (Klein & Kozwolski, 2000). “Maintain all data at the lowest measurement level possible” (Rousseau, 1985, p. 31). Conduct analysis at the level of the focal unit. When relating subunit variables to global unit variables, assign the global value to each subunit and conduct correlations at the subunit level, which “allows effects of unit characteristics on lower level responses to be assessed at the levels where those effects are hypothesized to occur” (Rousseau, 1985, p. 31).

Logic Models. Multilevel models as discussed above are fundamentally variable-oriented, causal and mathematical approaches. In contrast, process-oriented approaches are less inclined to modeling (Jaccard & Jacoby, 2010). Case-study logic models are a clear exception. Case-studies examine how and why a particular set of events and outcomes, or program, occurred (Yin, 2008). The case study method described by Yin is deceptively simple: First, define and design the case; second, prepare then collect and analyze data; and, third, analyze results and draw conclusions. Generally, Yin is a proponent of using case studies to “test” rival explanations. Once the subject and research question(s) are established, the researcher identifies various explanation, or program theories, for the events/outcomes. Yin (2008) discusses embedded case studies, with
multiple units of analysis, as a way to document projects—or other “process units” such as locations, meetings, or roles—within a program.

Yin (2008) suggests logic models as means for analyzing case study data. Logic models are widely used in practice, for designing and evaluating programs for business, education, healthcare, etc. (Conrad, et al., 1999: Cooksy, Gill & Kelly, 2000; W. K. Kellogg Foundation, 2004; Yang, Shen, Cao & Warfield, 2004; Renger & Hurly, 2006; Yin, 2008). “A logic model is a graphic representation of a program that describes the program’s essential components and expected accomplishments and conveys a logical relationship between these components and their outcomes” (Conrad, et al., 1999, p. 18).

Logic models represent the program theory against which empirical results can be compared for evaluation and research purposes (Yin, 2008). They provide a framework for multi-method pattern matching and triangulation (Cooksy, Gill, and Kelly, 2000). The W. K. Kellogg Foundation (2003) focuses on logic models’ use for design and implementation of programs. How logic models are used depends on whether the model focuses on theory, outcomes, or activities, the W. K. Kellogg Foundation (2003) tells us, because each has a different underlying rationale. Theory is about why a program will work. Outcomes are the expected results. Activities are what the program will do. It is important to make planned activities, expected outcomes, and theories clear during planning in order to maximize the value of evaluations.

The W. K. Kellogg Foundation (2004) breaks the logic model into two parts, planned work and intended results, and subdivides those into (1) resources/inputs, (2) activities, which are components of planned work, (3) outputs, (4) outcomes, and (5) impact, which are components of intended results, based on clearly stated assumptions. Conrad, et al. (1999) see a
program as consisting of “(1) the context; (2) the theory and assumptions that underlie the program’s intervention, (3) the intervention, and (4) the outcomes” (p. 18). Yang, Shen, Cao & Warfield (2004) present a model that, “has four major components: (a) issues and opportunities; (b) strategies; (c) outcomes; and (d) impacts” (p. 497), for each of three strategy clusters. Yin (2008) sticks with Wholey’s (1979) logic model structure of intervention, immediate outcome, intermediate outcome, and ultimate outcomes. Renger and Hurley (2006) are more vague about the components, but emphasize the importance of fully identifying all antecedent conditions (as opposed to more simplistic descriptions of context).

As Yin (2008) describes them, logic models have much in common with causal models:

The logic model deliberately stipulates a complex chain of events over an extended period of time. The events are staged in repeated cause-effect-cause-effect patterns, whereby a dependent variable (event) at an earlier stage becomes an independent variable (causal event) for the next stage. (p. 149)

Note the fundamentally different nature of “variables” in logic models: They are events rather than measurable constructs. Yin suggests using quantitative as well as qualitative data for these variables. The ATM (antecedent, targeting, and measurement) approach discussed by Renger and Hurley (2006) is very much a causal model, but incorporates a wide range of qualitative factors and scant mathematics. An outcome could be a profound change in the program.

Logic models can be used to analyze individual, organization, and program level activities/events, Yin (2008) says, and can capture transformations in units of analysis at each level. Cooksy, Gill, and Kelly (2000) demonstrate how logic models can capture multiple levels simply by combining multiple cases. The logic model, which is built of micro units, provides a
basis for comparing meso units. Taken together the logic models for multiple organizations—assuming they are in the same geographic area—also imply something about the macro level.

Yang, Shen, Cao, and Warfield (2004) look at a comprehensive program for increasing philanthropy and volunteerism on three levels. The top level is the overall initiative. The second level consists of three clusters: “(a) supporting emerging leaders and donors, (b) creating and sharing knowledge around philanthropy and volunteerism, and (c) building tools for sector sustainability and effectiveness” (Yang, Shen, Cao & Warfield, 2004, p. 495). Under each cluster at the lowest, are multiple projects. Their logic model incorporates each cluster’s objectives for all projects related to issues and opportunities, strategies, outcomes, and impacts. “No multilevel evaluation alignment would be feasible unless there are common principles to tie together the evaluations at different levels,” note Yang, Shen, Cao, and Warfield (2004, p. 497).

The Colorado Trust’s framework for its Change Through Advocacy program (Beer & Reed, 2009) exemplifies the application of a logic model and is a causal multilevel advocacy evaluation model. It begins with increasing in organizations’ capacities, goes through alliance building, to shared agendas and political will, and culminates with substantive impacts. This hypothetical model is used to guide change as an evaluation that, “ensures continuous learning within the advocates’ organizations—incorporating informed, evidence-based decision making into grantees’ day-to-day operations” (Beer & Reed, 2009, p. 152).

W. K. Kellogg (2004) is a detailed guide to creating a logic model as tool for planning and implementation. Its process begins with theory building, then specifying outcomes, and, finally, detailing activities. Yang (2004) presents this process as an evaluation tool by embedding it in a larger process: establish a logic model, then pose evaluation questions and subquestions, and then collect and analyze data, which lead to program improvements. The ATM approach’s
(Renger & Hurley, 2006) first step is identifying antecedent conditions. These will be so numerous that it will be necessary to target those on which to focus, which is the second step. Measurement is the third step. Yin’s (2008) process for developing an analytic strategy applies to logic models, and to time series, explanation building, and pattern matching. He suggests the strategy start with theoretical propositions, develop a case description, use qualitative and quantitative data, and examine rival explanations. The model must have construct, internal, and external validity, and be reliable, and Yin maintains that each strategy variously addresses each of these issues.

Of course, the above discussion is about developing logic models of specific cases. My goal is to provide a different general model because learning provides a different logic, which can be applied to particular cases. I propose to provide a theory that can be the basis for a learning logic model. Many of the concepts reviewed above, especially those regarding model building and multiple levels, may apply to building a general model. But my general model will necessarily have different components and a different structure.

Building a Multilevel Theory and Models of Learning

The purpose of model building is to identify the critical parts of a thing, and specify how those parts interact, in order to explain and predict how the thing works. Multilevel models are based on the realization that a thing might be affected by external context and environment, as well as internal characteristics. Based on the literature reviewed above, any theory requires a clear definition of the thing to be explained, and a multilevel theory requires similar clarity regarding levels. The conceptual framework should plainly impute factors thought to influence the thing to one and only one level. This not only makes research easier, it reduces the risk of
false and trivial conclusion. A conceptual framework that makes levels distinct makes for theoretical models that can be practically tested against reality.

I use the theory- and model-building methods reviewed above to suggest a simple yet powerful explanation of learning that applies to various levels of social aggregation. I also provide a conceptual framework to support it, for practical and scholarly purposes. The objectives are to produce causal, mathematical, and logic models, discuss and illustrate the putative theory, and indicate how the models might be tested and used. I specify underlying assumptions—building on the definitions in the introduction—and provide precise language for the theory.

In order to provide a comprehensive view, I focus on the areas between paradigms and approaches as I develop my explanation of learning. I deduce theoretical propositions by identifying gaps and overlaps between previously validated theories from different academic disciplines. These theories are the data I analyze in order to generate conjectures and problem statements that fit with but not within various academic perspectives. From these conjectures and problem statements I deduce primitives and units, along with the assumptions and laws of interaction (Dubin, 1969). Then, based on the assumptions and laws, I assemble primitives into concepts and construct a transdisciplinary conceptual framework from those concepts.

To put this in the terms of the literature on theory- and model-building, I conduct instantiation (Jaccard & Jacoby, 2010) and retroduction (Fiorina, 1975). I use Weick’s (1989) problem statements, thought trials, and selection criteria. In the process, I define unit(s) of analysis, identify variables (input, intervening, and outputs) including time, and operationalize them, and conjecture about the relationships (i.e., coefficients) between those variables (Babbie, 2010).
Generally, I work in the area between naturalistic, interpretivist, and critical paradigms, addressing all but hewing to none. To establish consensual validity I show how the proposed theory applies to practice. Ultimately, I hope to provide a theory that is simple yet useful.

I offer three general models for practitioners and researchers. A mathematical model will be provided as a means for describing the relationship between levels, how variation at one level explains variation at other levels. A causal model will illustrate how the characteristics of independent variables precede and determine the characteristics of the dependent variables. A logic model will present this as a process via which factors are transformed into outcomes through a series of functions. These models should prove useful for designing and implementing learning programs, as well as for inquiry that advances our understanding of learning. The causal and mathematical models will be variable-oriented, intended primarily for hypothesis testing. The process-oriented logic model will be primarily for program design and evaluation. My conceptual framework will act as a theory of composition to deal with data-aggregation issues and avoid misspecification, and to isolate mediating or moderating effects of context.

As a theoretical dissertation, these models will only go so far as to establish construct validity. I provide guidelines and suggestions for operationalizing variables and provide examples of how the theory might be applied, but will not actually collect or analyze any original data. The process-oriented model will translate learning into a general structure for a logic model, and a general model of the learning process. The model will be applicable to multiple levels, and will allow for transformation in subjects. It will emphasize the importance of antecedents to learning and the general activities or events that generate learning. As with the variable-oriented models, I provide some guidelines and suggestions on how to use the model for
designing and evaluating learning, based on the model but I do not gather or analyze original data.

The data for this dissertation are the theories from which I synthesize my proposed theory. The results will be a qualitative analysis of this data, and a conceptual framework for describing, integrating, and measuring these elements. So, I intend to make assertions about learning that hold across levels of social aggregation, from individuals through organizations to regions, and apply to various circumstances. I attempt to provide a coherent description and explanation to predict outcomes and understand the interaction of learning that occurs across, as well as within, levels. And, I provide means for documenting and testing those interactions and their effects. As underpinnings for the theory and models, I provide an innovative conceptual framework synthesized from the literature reviewed above.

Finally, in the discussion portion of this dissertation I illustrate use of my proposed conceptual framework, models, and theory with a thought experiment. Thought experiments have a long history and have been notably used by luminaries such as Galileo, Descartes, Newton, and, more recently, by Albert Einstein and John Searle (Brown & Fehige, 2011). I use thought experiment to illustrate my theory, which is a long-accepted use of thought experiment (Brown & Fehige, 2011), especially given practical limitations of empirical investigation. The thought experiment will allow me to discuss how my proposed theory might be applied and tested.
CHAPTER IV
FINDINGS

Analysis of Literature

Learning theory for each level of social aggregation has different metaphors—“tools to create compact descriptions of complex phenomena” (Weick, 1989, p. 529)—for framing the process of increasing capabilities. The metaphors discussed here—the cognitive constructor, loops of learning, and triple helix—come directly from literature reviewed in Chapter 2. At the micro level, the overarching metaphor might be called “the cognitive constructor.” A person makes the most of her or his innate, physical characteristics (including those that determine mental capacity) by acquiring information through experience, by observing others, and from texts—informational artifacts created by others. He or she constructs information into useful knowledge, building schemata, generating connections between concepts and experience, and producing behavior. Behavior invariably involves interaction with others, which constructs a shared reality. All of this in response to diverse yet complementary innate human drives. As a person, an individual’s general purpose is fulfillment of drives and needs. It should be noted that all levels are defined by the actions of individuals, so it is redundant to refer to the micro level as “individual.” Rather, this is the level at which individuals behave as persons rather than members of organizations or residents of regions.
The metaphor at the meso level is “loops of learning.” These are cyclic, iterated efforts to clarify and strengthen the relations between individuals in order to form (or reform) the organization. These loops occur at various scales, and are nested within each other. There are various theoretical views of the phases, stages, or steps in this cyclic process. The specific steps are not as important as is the common framework and shared experience for individuals that the steps provide. Organizations exist for specific, well-defined purposes, to which everyone in an organization relates. Individuals converge on purpose via the steps in loops of learning. The general concept that is prominent in theories of organizational learning is that of feedback and reflection. The organization provides a context for individuals to garner feedback from and provide it to each other, to guide behavior toward purpose.

The “triple helix” is a metaphor for learning at the macro level. It is academia, government, and industry learning interactively with diverse global and local agents, sharing ordinary and special knowledge. Place not only matters at this level, it is a defining characteristic of learning. Knowledge inheres to people in place. For regions, even more than organizations level, learning is relatively independent of particular individuals. Theorists are interested in how the structure of and interactions between economic-political-social institutions explain differences between regions, and differences in what those regions produce. Theory at this level emphasizes that learning is social.

Theories at each level attempt to explain a general output, or dependent variables. At the micro level the output is capability (as defined by Sen (1988, 1999), Nussbaum (2000), and Clark (2005)): ability to fulfill needs, how one acts in response to innate drives, and what decisions one makes in particular situations, given one’s capacity. This is what individuals construct, their capabilities. Of course, individuals can have many goals, purposes, and play
many roles—some conflicting—that change over time. But, drives remain. This provides the basis for judging capabilities. More subjectively, individuals, as persons, seek fulfillment; personal fulfillment provides the basis for innate drives and the rationale for capabilities.

For organizations, at the meso level, the output is performance—essentially producing goods and/or services via combination of capital and labor—in an economically or politically viable manner. In contrast with individuals, organizations judge performance on a limited number of relatively stable goals.

At the macro level the general regional output is advantage: some novel, unique, and valuable characteristic of a place. While regions have a set of general goals—infrastructure, jobs, quality of life, etc.—they are characterized by diverse, sometimes conflicting, sometimes complementary, often unrelated, purposes, connected by place. Organizational performance and regional advantage are undoubtedly dependent on individual capabilities, but the relationship obviously goes the other direction as well. Personal fulfillment is dependent on organizational performance and regional advantage, as well and individual capability. But because fulfillment is subjective, the fundamental dependent variable is individual capability. There are moral as well as practical reasons for making individual capability the fundamental unit of analysis, which I discuss below.

There are common factors, or independent variables, for theories at each level, too. Individual capabilities require information, models, stimuli, practice, feedback, etc., as well as prior knowledge—attitudes, beliefs, etc. The function of the cognitive constructor is to construct capabilities from these factors. Organizational performance depends on division of labor, means of production, and technology (which is essentially instantiated knowledge). The loops of learning are cognitive constructors operating on these organizational factors. Regional advantage
results from different organizations interacting to align their capital, labor, and technology, creating knowledge spillovers and network externalities in the process. The triple helix arises from connecting loops of learning to reinforce each other. These metaphors come directly from the literature reviewed in Chapter 2. The relationship between levels is implied by the metaphors but rarely if ever addressed in the literature.

Each of the factors and outputs are important at other levels, but each level seems to focus on and situate particular variables. Individuals, with their drives and capabilities, are situated in organizations via division of labor. Place-based advantages situate organizations in regions, making them more competitive, productive, and profitable. Each level provides synergies from lower-level aggregation. Indeed, synergy is what defines each level: Lower level entities are not just aggregated; they are combined in such a way that the whole is greater than the sum of its parts. How are these synergies realized and increased? What explains variation in the synergies? What explains differences in combining cognitive constructors via division of labor, and in connecting loops of learning to capture knowledge spillovers? How does the triple helix improve division of labor for multiple organizations? And, how do loops of learning boost capabilities of multiple individuals?

Theories at each level share certain fundamental realities. Agents tend to act in their own interests, at times collectively. But agents’ understanding of their own and others’ interests is limited; and circumstances can countervail. Each agent has a unique set of resources, particularly information, at her or his disposal. To create meaning and maximize value, agents exchange those resources as goods and symbols. Agents construct institutions with roles and rules, and narratives about them, to provide additional certainty to those exchanges. Through interaction agents develop a shared understanding of interests and resources. Undergirding all of this is the
concept of development; that one can methodically improve one’s state, especially by acting collectively.

Recursion and reflexivity are important in all learning theories at all levels: self-action, self-awareness, and self-regulation. Whether individual, organizational, or regional, the learner identifies herself, himself, or itself as an entity, and it acts upon itself, applying its output to its factors. So, individuals behave to acquire better information. Organizational performance includes restructuring capital and labor. Innovations generated by regions fuel interactions within them. Self-action can be seen as the means by which the metaphors at each level are integrated: Multiple individual cognitive constructors acting upon themselves in coordination generate organizational loops of learning, and many of those loops acting upon themselves in concert accrete into regional triple helixes.

The other concept or construct that is common to all theoretical areas is the information network. The simplest version of this is nodes that sense and signal each other. These nodes could be nerve endings, individuals, or enterprises. They sense reality and produce signals based on the sense data, as determined by simple rules. The rules employed depend on signals from other sensors. And, the sensing can never be passive; reality must somehow change the node, activating or interfering with it. Conceptually, such a network depends on how sensors are attuned to each other, how they sense signals from other sensors as distinct from other parts of the world. The metaphors, outputs, factors, and common concepts related to learning at the micro, meso, and macro levels are summarized in table 1.
Table 1 Summary of Metaphors, Outputs, Factors, and Common Concepts for Learning at Individual, Organizational, and Regional Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Learning Metaphor</th>
<th>Output/Dependent Variable</th>
<th>Factors/Independent Variables</th>
<th>Common Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro: Individual (personal)</td>
<td>Cognitive constructor</td>
<td>Fulfillment</td>
<td>Physical characteristics, information, texts</td>
<td>Agentic action</td>
</tr>
<tr>
<td>Meso: Organizational</td>
<td>Loops of learning</td>
<td>Performance</td>
<td>Capital, labor, technology</td>
<td>Information networks</td>
</tr>
<tr>
<td>Macro: Regional</td>
<td>Triple helix</td>
<td>Advantage</td>
<td>Institutions, infrastructure, resources</td>
<td>Reflexivity</td>
</tr>
</tbody>
</table>

The general theoretical picture is one of micro-level knowledge processes, applied recursively and reflexively to allocation of capital and division of labor at the meso-level, enabled by macro-level institutions and infrastructure. The socio-cognitive constructor is enabled by being embedded in loops of learning and triple helices, by engaging in action and reflection with others based on shared places and purposes. In this dissertation I conjecture that there is phenomenon or process that occurs across levels whenever learning—particularly generative learning and innovation—occurs: Community. The independent variables and shared realities become factors of functions that determine learning across levels.

Proposed Theory

The theory of learning I propose to explain learning at all levels and the relationship between learning at various levels is essentially quite simple: community yields learning. Community results in learning, the stronger community is the greater the learning, and
substantive learning does not occur without community. Community makes people smarter. Community also makes organizations and regions smarter. This theory requires much explication. Before doing so I provide a conceptual framework for use in applying and testing the theory, and I clearly state some fundamental aspects of this theory. First, though, I should provide some background on the theory and how it was developed.

This theory builds on existing validated theories and shows how those theories are consistent across levels. This theory is transdisciplinary. It draws indiscriminately—so to speak, because it is carefully considered—from numerous academic fields. My goal is a theory that is comprehensive yet focused, that is both practically and scholastically useful. This theory has been developed over the course of my doctoral work in a manner similar to those discussed by Mill (1959), Weick (1989), Gioia and Pitre (1990), Lyndham (2002), Swanson (2007), Varian (2009), Jaccard and Jacoby (2010) and Ouliaris (2011). Prior to my doctoral studies I was concerned with the relationship between individual learning about technology, particularly among traditional leaders, and how the organizations those individuals led adopted and used technology, and how technology-use spilled over from those organizations into the surrounding region. It is this conundrum that motivated me to pursue scholarly knowledge about leading and learning.

My theory building process has been embedded in my studies, doing exactly as Mills (1959) recommends: identifying relevant information, determining relationships between pieces of information, eliminating the irrelevant, and restating my questions. I have found relevant information in most all the behavioral and social sciences. The relationships became clear through innumerable hours of discussion and study. My practical work in economic development and education helped me understand what was relevant. And, the writing I’ve done has
essentially been a continual restatement of my questions, artificially selecting ideas via instantiation and thought experiments (as discussed by Weick (1989) and Jaccard & Jacoby (2010)). My approach has not been as rigorous as Weick might like but it has been more methodical than Varian’s (2009) approach.

The following text presents the results of this process. Ultimately, I illustrate the results via a thought experiment regarding the impact of high-speed internet access (i.e., broadband) and how that impact might be increased via innovative intervention by higher education. This will replicate the theoretical instantiation (Jaccard & Jacoby, 2010) I’ve done over the last four years. The core results are structured around Dubin’s (1969) Theory-Research Cycle. So, before illustrating the theory, I specify units, identify laws of interaction, define boundaries, and posit possible system states. As I work through these steps I provide three models for explaining, predicting, and understanding multilevel learning, a causal model, a mathematical model, and a logic model. Each of these models, and the theory itself, will be constructed within a conceptual framework, which provides a basis for addressing each portion of the Theory-Research Cycle.

The methodology literature reviewed in chapter 2 of this dissertation makes it clear that a good theory is falsifiable, if not verifiable. Theoretical constructs and measures must be valid and reliable to use. A conceptual framework should make it clear how to validate and verify theory. As discussed above, the three general criteria of truth (veracity) are coherence, consistence, and correspondence, and the three forms of validity are subjective, objective, and intersubjective. These characteristics also provide the diverse criteria promoted by Weick (1989) for selecting theoretical propositions.

My conceptual framework establishes objective validity by building on existing, validated theory. It seeks subjective validity via practical applicability. Intersubjective validity
comes from finding commonalities between practice, theory, and various paradigms. This is a bit of a challenge because scientists and professionals tend to focus at one level. Not only are there paradigmatic conflicts within levels, there are also paradigmatic disconnects between levels. I address this first by identifying how fundamental aspects at each level relate to each other, based on literature reviewed above, and second by offering a way of thinking about structure that applies at all levels. Each level functions differently, but in complementary manners. I feel these conflicts and disconnects actually benefits my theorizing by providing the diverse perspectives that Mills (1959) calls for. So, my conceptual framework integrates diverse academic perspectives to provide diverse theoretical criteria in a manner that is reasonably simple yet provides descriptive power and measurable constructs.

Before detailing my conceptual framework, allow me to briefly summarize it so the reader does not get lost along the way. In this framework: (1) the fundamental unit of analysis is the individual human being. Individuals act agentically at the micro level as persons, at the meso level as members of organizations, and at the macro level residents of regions. Individuals’ behaviors can be observed to measure the information and materials they use, and to infer their attitudes and beliefs. Their connections to others determine what information and materials individuals have, and their attitudes and beliefs define individuals’ visions of what is desirable and possible. (2) Individuals’ behaviors, connections, and visions can be described and measured. Individuals’ connections and visions can be observed as behavior. Those behaviors can be ascribed to micro, meso, or macro levels, analyzed to identify variation, and that variation can correlated between and within levels. (3) The dependent variable is individual real freedoms, or capabilities, which can be described in terms of knowledge and measured in terms of liberty, prosperity, and wellness. An individual’s freedoms can be negatively or positively correlated,
between and within levels, with the personal fulfillment of others, and with organizational performance and regional advantage. (4) The independent variable is community, or rather the socio-cognitive functions that result in a shared sense of community. These functions are the input factors that cause individuals—personally, as organizations, and as regions—to gain capabilities. Hypothetically, the level of community increases with each function, leading to increased capabilities.

The next section discusses the conceptual framework and its elements in detail. Then I explicate the multilevel theory of learning using the conceptual framework, including a causal model, a logic model, and a mathematical model. Finally, I illustrate the theory by applying it to higher education and information and communication technologies.

Conceptual Framework

A multilevel theory of learning should fill critical gaps in theories of learning. It should enable educators, policymakers, and researchers to better understand the role of context in learning and how learning aggregates. Here I seek to provide a set of concepts and propositions that addresses how collective capabilities impact individuals, and how individual knowledge impacts development of collectives. A conceptual framework for a multilevel theory can be built on the individual as agent—drawing on the work of Bandura (2001)—acting in her or his own interests, which emerge from innate drives (Ryan & Deci, 2000; Lawrence & Nohria, 2002) as intentions (Ajzen, 1991) and motivations (Deci & Ryan, 1985). My fundamental unit of analysis is the individual human being, who acts agentically as a (1) person, (2) member of organizations, and (3) citizen of a region, and who sees, has, and does in different ways as each. This conceptual framework affords three levels of analysis by distinguishing forms of agentic
behavior each of which has a defining function. Those functions, and the levels, can be
distinguished by cognition, collectivity, place, and purpose.

Unit of Analysis

Individual human beings have inherent capacity to carry, handle, process, use, etc., some
quantity of information and materials, which I refer to as assets. Capacity is determined by
physical attributes, including cognitive capacity. Capacity is limited but can be allocated to
various purposes—generally, personal, organizational, or regional—and used in different ways.
It can be supplemented by other individuals or with implements, but is essentially fixed (at least
in the short-run). Individuals also have ability to affect or transform the quality of the
information and materials they handle. Ability can be enhanced and improved, but this requires
capacity. All of this is done via activities. (This is something of a restatement of Miller’s (1956)
theory that humans’ cognitive capacity is limited to seven plus or minus two bits of information,
but we are able to handle greater amounts of information by “chunking” these bits together.)

Psychologically, individuals use embodied mental models, or schemata, to guide action
information and manipulating materials. For example, humans only have two hands so can only
carry two relatively light things. This is our unaided carrying capacity. We have developed
numerous means with associated schemata to enhance our abilities: bags, baskets, carts, juggling,
trucks, etc. It takes time, as well as information and materials, to create, and even to use, these
things. So, consider a person carrying water. Unaided, he or she can carry little, if any, water.
Water-carrying capacity is greatly increased with a bucket, and that capacity is doubled with two
buckets. But, where do the buckets come from? First, there has to be the idea of a bucket,
possibly from seeing rainwater trapped in a broken gourd. Then, the bucket must be constructed from a gourd or animal hide or coopered wood. Then, the buckets must be filled and carried, which can be physically difficult if the water is inaccessible. This is because our human arms can only reach so far, and our hands can only grasp for a limited time. So, the person might create a lever for drawing up water and a yoke for carrying two buckets. All of this takes time. The more skilled the person is at constructing things, the more quickly he or she can make the buckets, lever, and yoke. Also, some buckets, levers, and yokes are more functional—less likely to break, require less physical effort or pain, don’t leak or spill water, etc.—than others. The individual must have both the mental content about functional elements (buckets, lever, and yoke, but also not to mention components like lumber and rope) and how those elements work together, and the ability to realize that functionality by transforming natural materials into a water-carrying system. While the individual is creating the components and putting them together in a system, he or she is not carrying water. But, once constructed, the system greatly increases the individual’s water-carrying capacity, so he or she can carry the needed water quicker.

So, what are we analyzing here, how much water an individual can carry? No, what we are really interested in is what the individual does with the water when he or she doesn’t have to carry it. People must have water. Prior to the water-carrying system the individual (and those who rely on her or him) had to spend a lot of time carrying water. With the water-carrying system, the individual can spends much less time on that task and has time to spend as he or she sees fit. The individual does not exist to carry water. Rather, water is means to the individual’s survival. The individual can use it personally, or he or she can use it as part of an organization, or he or she can contribute to a system that is used by other individuals—as persons or organizations—in a region.
There are certain realities—from humans’ need for water to the fact that built systems deteriorate—that create imperatives for individuals; things they must do. What I am focused on here is how those imperatives arise and how they are addressed. These are really issues of what determines individual capabilities, and of how individuals utilize their capacity and develop their abilities. I am concerned with means and reasons, and how those arise.

As agents, individuals have common, complementary, and conflicting interests, they have differing, but always limited, amounts of information (and materials), and they interact based on these interests and information (Thibault & Kelley, 1952; Homans, 1958; Coase, 1960; Simon, 1976, 1991). There aren’t just complementary and conflicting interests between agents; different interests exist within individuals as they act agentically at the micro level as a person, for an organization at the meso level, or at the macro level in a region. Relationships between and within levels can be positive or negative: the micro can enhance or undermine the meso, and vice versa, and the same is true for the macro.

How to balance for personal, organizational, and regional agency is a fundamental issue for individuals. Intentionally and methodically increasing abilities—learning—is one means for achieving this balance, which allows individuals to accommodate competing demands or to restructure those demands to be complementary. Another means for balancing differing interests from various levels is to organize and to create infrastructure and institutions, or to restructure existing organizations and institutions. These activities are also forms of learning—collective learning.

For moral and practical reasons, this conceptual framework focuses on individuals as ends rather than means. Practically, it can be difficult to define and determine ends in the context of organizations and regions. For an organization, for example, is the end profitability or
customer delight? Elsewhere I identify (from literature) organizational performance and regional advantage as general goals or metrics. But who says exactly what these things are? Practically (although, admittedly this is not unproblematic), individuals are the ultimate arbiters of what is meaningful to them. While we can say organizations and regions—and persons, for that matter—are social constructions, we cannot say that of individuals. It is individuals who create social constructions. For research and theoretical purposes, we can reduce the risk of the cross-level fallacies and ecological fallacies that are endemic to multilevel analysis (Rousseau, 1985; Klein, Tosi & Cannella, 1999; Klein & Kozlowski, 2000) by consistently analyzing learning and its effects at the individual level.

As notably pointed out by Kant (1785/1993), moral logic dictates that one should not treat others as means. Researchers (and educators) who see knowledge as an end can too easily objectify subjects in the process. Focusing on individuals as the ultimate unit of analysis helps to avoid this moral pitfall. Even when considering regional and organizational learning, the fundamental question is, “how do individuals benefit?” Of course, none of this is to say that individuals cannot be considered in context. We can we analyze individuals in groups and places by considering their activities and assets. We can analyze individuals’ context in terms of what they do, have, and say, their behavior, connections, and visions.

In the end, though, the question must be what these things mean for the individuals involved. The quality of a quantity—whether it is positive or negative—is determined by whether it reduces or increases drives and needs of individual human beings. Ultimately, fulfillment—reduced drives and needs—emerges as liberty, prosperity, and wellness. So, these are what we ultimately must analyze about (and as) individuals to determine their learning.
Levels of Analysis

Individuals act first and foremost to construct and maintain themselves as persons. Such action defines and delimits the micro level of analysis. People have a general purpose—which I shall refer to as fulfillment—that includes creating or finding specific purpose(s). Personal purpose is based on innate drives and human needs. Personhood is the ultimate end, the most compelling and general purpose: To be an autonomous, competent, and related person, who can acquire, bond, and defend to satiate physiological and psychological needs. Persons function as socio-cognitive constructors of capabilities and knowledge for fulfillment of drives and needs. As discussed in more details below, capabilities are comprised of capacity and ability. Capabilities are what others observe of one’s knowledge, which can be described as knowledge elements or knoels (discussed below). Capabilities are evident in personal fulfillment (micro level), organizational performance (meso level), and regional advantage (macro level). Ability is enabled and capacity is limited by regional advantage and organizational performance. Ultimately, capabilities can be described and measured in terms of liberty, prosperity, and wellness, which are the ultimate goods, the dependent variables, and what is analyzed about individuals.

People are cognitive constructors. Individuals achieve personhood, in part, by processing perceived information (which is accessed via connections) for actions via rules (which are integrated into vision). People continuously improve rules based on results of actions. Individuals instantiate rules and schemata into artifacts and practices, which can then be replicated and shared. Socially, these phenomena manifest as organizations that enable persons to gather information and to act more effectively and efficiently (Smith, 1776/1904; Olson, 1965; Williamson, 1981, 2000; Senge, 2006). Bandura (2001) points out that:
[T]here is no emergent entity that operates independently of the beliefs and actions of the individuals who make up a social system. It is people acting conjointly on a shared belief, not a disembodied group mind that is doing the cognizing, aspiring, motivating, and regulating. (p. 14)

Such action defines and delimits the meso level of analysis.

Metaphorically, organizations are not just aggregated agentic socio-cognitive constructors. They function as groups engaged in loops of learning regarding collective performance of some purpose, evaluated in terms of fulfillment (of customers, employees, partners, etc.). Organizational performance is determined by the amount of capital and labor (“means of production,” and aggregated individual capabilities allocated to organizational purposes), and by division of labor and technological quality. These are the organizational equivalents of capacity and ability, which can be described and measured.

Organizations emerge from general, innate human drives, but they do not have such drives. Instead, organizations have particular purposes, e.g., their missions. Individuals divide up their actions and pursue their drives via organizations. Organizations don’t have capabilities, either, per se. An organization’s capacity is determined by the capital—buildings, equipment, stock, and cash money—and employees/labor available for its purpose. The arrangement of capital and labor, including technology, determine an organization’s ability to apply available capacity to purpose. In this conceptual framework we are not so concerned with whether capacity comes from capital or labor; the primary focus is how they contribute to organizational performance. Conceptually, organization is a means to increase the collective ability of a group with given capacity. So, two groups with similar physical characteristics and resources may perform at very different levels simply because of how they are organized. For example, an organization might have many resources—physical, human, financial, etc.—but still perform
poorly, whereas an organization with few resources may be highly effective. This is a difference in ability and use of capacity.

Organizations impact individuals in two general ways. First, individuals use the products of organizations for personal fulfillment, either directly as customers or indirectly via proximity and society. For example, a company may produce laborsaving devices for their customers while producing pollution that sickens the company’s neighbors. Second, organizations aggregate individuals’ capabilities as employees. Individuals, in return, allocate some of their capabilities to organizational purposes, either directly as an employee or indirectly as a customer/neighbor. Such an allocation results can increase capabilities, but can also have a negative impact. Time spent working can positively impact prosperity while negatively affecting wellness.

Organizations have a general purpose—to perform—that is tied to their specific purposes, their missions. To maintain viability, members of an organization continually strive to improve performance vis-à-vis its mission. Members collectively reiterate improvement processes, and reflect critically on the mission and improvement processes (Argyris & Schön, 1978; Deming, 1986; Argyris, 1999; Liker, 2004; Senge, 2006). Collective cognition involves members of the organization thinking together, in coordination, with a share base of knowledge and means of communicating. How organizations combine people and resources may be more important than what people and resources are combined. This how is technology: formalized, replicable means of arranging things to achieve ends and solve problems. In many ways, technology is the social equivalent of schema: Technologies are means for making sense of and manipulating the environment that are common to a group or society.

Regions function as multiple loops of learning engaged in geography-based triple helix of interactive learning for constructed advantage, evaluated in terms of performance and
fulfillment. The environment, infrastructure, and location determine regional capacity; the quality of institutions determines regional ability. Together these things determine regional advantage. How regional advantage contributes to personal fulfillment is mediated by organizational performance.

Place is the general context of agentic action, including organizations. Groups of people organized for particular purposes interact and overlap with other such groups in place. This is essentially the axiom of regions (Arensberg & Kimball, 1965; Sanders, 1975; Fischer, et al., 1977; Fischer, 1982; Saxenian, 1994; Florida, 1995; Audretsch, 1998; Cooke & Morgan, 1998; Asheim, 2003; Safford, 2009). Where the basic metric for persons is capability, and performance for organizations, regions are evaluated in terms of the advantages they provide to those who reside in them.

Regions have natural and built environments that individuals use for personal and organized agentic action, and which are tied to location. The regional environment determines the region’s capacity. Regions also have institutions (Amin and Thrift, 1995; Boschma and Lambooy, 1999; Hauser, Tappeiner & Walde, 2007)—“complex social forms that reproduce themselves such as governments, the family, human languages, universities, hospitals, business corporations, and legal systems” (Miller, 2012, para. 1). Institutions are regions’ equivalent to ability. Regional institutions in conjunction with infrastructure and other resources comprise the regions’ capabilities: regional advantage.

Effective utilization of regional resources depends not just on individual and organizational abilities, but also on interactions between organizations within and outside the region (Granovetter, 1985; Saxenian, 1994; Amin and Thrift, 1995; Morgan, 1997; MacKinnon, Cumbers, and Chapman, 2002; Boschma, 2005; Hauser, Tappeiner & Walde, 2007). Practically,
there is coherent regional action that is distinct from that of particular organization and individuals. They act differently together in place. Metaphorically, knowledge spills over from organizations as they interact, and this knowledge becomes a place-based, regional resource for organizations and individuals (Audretsch, 1998; Asheim, 2003).

Conceptually, persons, organizations, and regions have formal and functional differences. Formally, people are socio-cognitive constructors that function to fulfill diverse drives—physiological and psychological (Maslow, 1970), autonomy, competence, and relatedness (Ryan & Deci, 2000), to acquire, to bond, and to defend (Lawrence & Nohria, 2002). Again, the basic metric for persons is individual capabilities.

Organizations take the form of people interacting through loops of learning to combine capital and labor. Organizations involve multiple individuals, and individuals can be involved in multiple organizations. The general function of organizations is to produce a set of goods, and to exchange those goods so as to benefit those within the organization and those involved in the exchange. Performance is the essential metric.

Regions take the form geographic concentrations of people organized in groups interacting and overlapping in a shared built and natural environment. Regions don’t have explicit purposes, but they do function to capitalize on—to exploit, improve, and maintain—the built and natural environment. All of this emerges as various sectors’ loops of learning interact. Advantage is the essential metric for regions.

These levels are formally and functionally embedded in (or encompass) each other. A simple way to say this is that people plus materials and technology comprise organizations, and organizations plus infrastructure and institutions comprise regions. But this is not just an over simplification, it is backward and treats individuals as means. Fundamentally, regions and
organizations exist as collective agents for individual benefit. Regional capacity plus regional ability determine regional advantage, which contributes to organizational capabilities. Organizational capacity and organizational abilities determine organizational performance, enhancing individual capabilities. Individuals allocate their capabilities to personal, organizational, and regional purposes based on expected fulfillment. This is the simplest possible way of describing the relationships between the levels of analysis without losing validity and veracity.

There are a few salient characteristics of the personal-organizational-regional continuum that should be noted. For one thing, to state the obvious, it varies in number from one to many (millions, even). Although it could be argued that individuals might be decomposed into roles or traits, the fundamental, indivisible unit is the individual. With the number of individuals there is an increasing number and diversity of purposes; each individual has multiple (possibly conflicting) drives and concomitant purposes, and each organization layers purposes on those. While regions don’t have particular purposes, they are characterized by shared agendas (better schools, less congestion, more jobs, etc.) and the general purpose of providing advantages to residents. As scale increases so does the number of activities and assets; there is an increasing number and diversity of resources. There is also less coherence and more diffuse ownership of these resources. As resources aggregate, so do the roles and rules for acquiring, holding, and using resources. The interplay of roles and rules increases exponentially. And, with all of this, there are longer and longer time horizons. More people and more things mean more conflicts and increased transaction costs (to find, reach agreements, and coordinate actions). The more people, the longer things take.
There are important structurally similarities between individuals, organizations, and regions that provide a common basis for describing, measuring, and relating them. Fundamentally each of these units can be seen as complex, adaptive, self-regulating, socially constructed systems (Berger & Luckman, 1966; Bertalanffy, 1968; Maturana & Varela, 1980; Luhmann, 1990; Holland, 2006). Systems at each level are of different scales, function differently, and take different forms. But their structures—components and their interactions—and synergistic natures are generally similar. As complex adaptive systems individuals, organizations, and regions are contain and are embedded within each other and self-similar across scale (Holland, 2006).

Self-similarity could be theoretically problematic because it translates into isomorphism. This is a different type of isomorphism than that which worries Klein, Tosi, and Cannella (1999). Where they were concerned about constructs having the same function with different structures at different scales, what we have here is structural isomorphism: Similar structures with different functions at various levels. Structural isomorphism allows for simple conceptual framework that enables simplification, as recommended by Ashby (1970), Fiorina (1975), Weick (1989), Varian (2009), Jaccard and Jacoby (2010), and helps to avoid problems with misspecification, ecological fallacy, and cross-level fallacy discussed by Rousseau (1985). So what is it that systems at all levels have in common?

All of these systems behave: they operate in a purposive, agentic manner, albeit with different general purposes at each level. And, of course, beyond the individual level it is collective agency. Second, each level has distinct systems of beliefs about what they are and what they hope to become, why they exist, what they can and cannot do, and how they do and
should operate; they have vision. More accurately, individuals see things differently as they act as persons, organization members, and region residents, and operate under different sets of beliefs. These beliefs exist in individuals’ minds but are instantiated in organizations’ roles and rules and in regions’ infrastructure and institutions. Third, all of these systems have connections with other, similar systems via which they exchange information and materials.

These are not independent characteristics; behavior, connections, and vision are different aspects of a system. Visions are the internal subjective aspects of individuals, organizations, and regions, which are qualitatively expressed via behavior. Connections are the external objective aspects of these systems, which are quantitatively enacted via behavior. Behavior is the common intersubjective aspect of these systems that is the means of enactment and expression.

There is an important conceptual and practical implication of structural isomorphism: Conceptually, each aspect of a system at any level has the same information content. This is what it means to different aspects of one system; a system has a unitary set of information, and different systems have different information. Yet all systems are embedded in an environment, so have a great deal of shared information.

Scientists, professionals, and others who might employ this proposed theory, and the organizations and regions in which they are embedded, behave, too. While they can observe enactment and expression of others, they can never be separate from them. The objective and subjective are indefinite ideals that are transformed by observation. I delve into the implications of this in more detail when I illustrate my theory. For now, let it suffice to say we must all learn together, along with our subjects.

More immediately, as I discuss connections and vision in more detail remember that behavior is implicit in them (and vice-versa). It impossible to fully separate and independently
define the objective and subjective. We are all in this together so we cannot be either totally independent of or totally integrated with any other. Complete knowledge may be asymptotically approached but never achieved, which makes theory building all the more—not less—important and interesting!

*Vision*

Vision is generally defined as “intelligent foresight … the manner in which one sees or conceives of something … a mental image produced by the imagination,” as well as the faculty of sight (vision, 2003). My definition of this construct is more detailed and specific, but the standard definition includes the basic elements: belief about what is and what could and should be. Vision encompasses two central elements of sociocognitive theory: perceived self-efficacy, or belief regarding one’s ability, and outcomes expectations, or belief outcomes of action (Bandura, 1986, 1997, 2001, 2006). It is a particular component of mental model (Senge, 2006) and type of schema (Piaget, 1973, 1983; Hirsch, 1987).

Visions are beliefs about what is, what could be, and what should be—current and future states, including self, others, and environment—often construed as mental images. Behind these beliefs are practical theories regarding factors that drive or enable action, and about factors that limit or disable action, including what is in the minds of others (e.g., their purposes, rationales, and visions). Objective information and subjective feelings undergird vision, giving us a sense of what is beneficial and what is desirable, which can be two very different things. Future and present; drivers and limiters; information and feelings; these comprise the “sides” of vision, which define a three-dimensional conceptual space, illustrated in figure 1. The intersubjective resides in the middle of this space.
Senge (2006) provides an extensive consideration of mental models and shared vision but does not discuss personal vision in any detail, and treats the two as separate constructs. He basically equates vision with purpose. My approach is more similar to Bandura’s (1997, 2001) concept of collective efficacy. He characterizes it as “an emergent group-level property, not simply the sum of the efficacy beliefs of individual members” (p. 14), that operates via individuals in addition to their personal perceived self-efficacy. Thus personal vision and collective vision are separate but co-determinant aspects of vision that are manifest by individuals via their intentions and actions, which depend upon individuals situation and their roles in those situations.

<table>
<thead>
<tr>
<th>“Topside”</th>
<th>“Outside”</th>
<th>“Inside”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivers and enablers</td>
<td>Objective-Empirical</td>
<td>Subjective-Normative</td>
</tr>
<tr>
<td>“Bottomside”</td>
<td>Possible</td>
<td>Practical</td>
</tr>
<tr>
<td>Limiters and constraints</td>
<td>Practical</td>
<td>Inferential for future</td>
</tr>
<tr>
<td>“Backside” (hindsight)</td>
<td>Desirable</td>
<td>Beneficial</td>
</tr>
</tbody>
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Figure 1 The “Sides” of Vision

Let’s consider some examples or iterations of vision. A police officer chasing a suspect sees that it is possible to speed after the suspect at 100 miles per hour. But, recognizing that it is impractical because it puts others at risk, she calls for backup instead. A student taking a test feels the desire to cheat but knows it is not acceptable. While a higher grade would be beneficial, he will not benefit from increased knowledge needed for the test, and he definitely won’t benefit
if he’s caught. A corporate executive considering an acquisition that is desirable for its assets might feel that it as a bad cultural fit so her company would not benefit.

Each of these examples illustrates a different vision space—a different combination of beneficial, desirable, possible, and practical. Each demonstrates visions of different intensity. The police officer’s vision is low-intensity, overshadowed by the experience, as she is acting almost automatically in response to intensive training. The student is contemplating his future and his grade in a medium-intensity vision. The executive has a strong, if not clear, high-intensity vision of what her company is and where it is going. It is easy to imagine others in the same situation viewing it differently, or the same people having hindsight different from their foresight. Each person is informed by backside experience and frontside expectation, as well as topside drivers and bottomside constraints.

Three general points about vision: First, it is highly complex and dynamic, yet often comes down to something quite simple that can be effectively communicated to others. Second, vision is inherently subjective and qualitative. Even the “outside” of vision—viewing something from a factual and objective perspective—is a subjective phenomenon that cannot be directly measured. Third, although they are inherently qualitative, vision can vary greatly. When we speak of a “visionary,” we usually mean someone who has a clear and compelling idea for some ambitious goal. Sometimes we mean an artist or eccentric who has an odd perspective or unusual goal. We do not refer to ordinary people with mundane visions. Regular folks have visions—beliefs about what is, what could and should be—they just aren’t notable.

All visions, extraordinary or mundane, are nominally knowledge—informed true beliefs—that can be described by knoels (knowledge elements, discussed below in the section on “Knowledge”). This knowledge is expressed in texts, and can be verified in terms of coherence,
consistence, and correspondence. So, for practical purposes, a text can be analyzed to ascertain what it means, how sensible its meaning is, how its meaning varies, and how it relates to what others see as meaningful. I provide more detail about how to describe vision in the discussion section, below.

**Connections**

Connections are seemingly more straightforward than visions: A connection is a means of transferring information or materials. They are discrete and clear cut, even when they are qualitative: She is a police officer. He is a student. She is a corporate executive. Each of these connections can be unpacked to reveal the information and materials that go along with them. Many connections are simple, stable tethers of constancy that anchor identity and determine what one has. Some connections happen very rapidly and are totally unique. And, such connections can have huge implications.

Connections may be most commonly understood in economic terms, as exchange and production. The concept of persons having roles, operating under rules, and working with resources was well established by Smith (1776/1904), Ricardo (1817), and other classical economists if not before. Trade, a primary concern of Smith, Ricardo, and many other economists, is part and parcel of connections. The production function, an essential element of neo-classical economics that states that production is a function of capital and labor (Mishra, 2007), is essentially a highly abstracted and simplified description of connections, at least their results.

Transaction cost economics (Williamson, 1981, 2000), social exchange theory (Blau, 1964; Befu, 1977), and resource dependency theory (Pfeffer & Salancik, 1978) are essentially
formal descriptions of how connections operate. Social capital and social networks (Granovetter, 1973, 1983; Fischer, et al., 1977; Putnam, 1993; Coleman, 1988; Lin, 2002; Burt, 2004) are purely sociological descriptions of connections, as is social identity theory (Turner & Reynolds, 2010) and actor-network theory (Latour, 2005). Much of this depends on theory of mind, the belief that others have a mind (Premack & Woodruff, 1978; Baron-Cohen, 1991), because it enables connection and identification. A fundamental element of these theories is that individuals interact and share resources based on socially constructed roles and rules, which links the concept of connections to social construction (Berger & Luckmann, 1966; Latour, 2003).

Connections manifest as quantities of information or materials with certain qualities, associated with other persons, organizations, and regions: The police officer arrests a number of criminals for various offenses; the student takes a number of tests at a university, making different grades; the executive acquires another company for an amount of money. Economists would note that each of these combines assets (capital) during activities (of labor) to achieve an outcome (production). Assets, activities, and outcomes all have value associated with them, determined by demand for, supply of, and uses for those things. Psychologists would put the values in more subjective terms, based on drive reduction or needs fulfillment. Sociologists look at roles, rules, and resources in a broader perspective, but basically these boil down to number and types of connections.

Connections can be counted, subdivided by type, and measured by the amount or value of information and materials conveyed. Generally, connections can be strong or weak, based on their frequency and intensity (the amount of attention and/or resources involved). Drawing on economics, strength can be measured in terms of activities (labor intensity) and assets (capital intensity). As Granovetter (1973, 1983) notes in his seminal works, strong and weak ties both
have particular value. Connections can serve to bond individuals into groups or to bridge between the groups (Coleman, 1988; Putnam, 1993; Lin, 2002). As Burt (2004) gaps can be as important as bonds and bridge. Social network analysts measure nodes in terms of centrality: betweenness, closeness, degree, and eigenvector (Lin, 2002; Knoke & Yang, 2008). In this conceptual framework, focusing on connections, valence is the effect a connection has on centrality. Connections can have positive or negative valence. The practical implication of valence is that positive valence involves opportunities while negative valence is associated with problems. These elements create a three-dimensional conceptual space, illustrated in figure 2.

Two general points about connections: First, they are basically simple—two parties, exchanging one thing for another—yet they can easily become highly complex and dynamic. Second, connections are intrinsically objective and quantitative; they are highly amenable to valuation. Even in their most subjective form, connections come down to what I get, what I give, and the relative value of these items. Connections have physical capacity to carry certain amounts of information and materials, and have ability to accommodate certain qualities or types of information and materials.
Behaviors

Behaviors are patterns of action in determined by beliefs in context. Acts occur in a shared, socially constructed reality, which makes them behaviors. While we can objectively observe an act, we can never fully separate it from our own acts. While we can presume there is subjective meaning for an act, we can never be truly sure that the meaning is the actors’ and not our own. I reference a great deal of literature from across the behavioral sciences in this dissertation, and summarize key concepts elsewhere in this section. Therefore, I do not rehash the concepts regarding behavior, except to make four general points about it.

First, in order to understand behavior it helps to understand beliefs and context, the internal and external aspects of behavior. This is where this conceptual framework helps: Connections are all about context, visions composed of beliefs. Connections are amenable to objective, quantitative measurement, and visions are amenable to subjective, qualitative description. Measures of connections can be validated subjectively, objectively, and intersubjectively. But propositions about connections cannot be verified, only falsified. Descriptions of vision can be verified in terms of coherence, consistence, and correspondence. But, as subjective beliefs, they cannot be validated; they must simply be accepted. In a sense the behavior-connection-vision (BCV) framework is a means for triangulating to understanding actors.

Second, unfortunately, it is impossible to directly measure connections or describe visions because we are immersed in the intersubjective. Instead, we can only measure and describe behaviors as indicators of connections and visions. The implication is that the BCV framework turns behavioral science on its head. We are not really interested in behaviors; we are interested in connections and visions. Rather than understanding behavior by considering
connections and visions, we are validating connections and verifying visions by observing behaviors. What we’re really interested in are capabilities—the interplay between ability and capacity, what is not chosen as well as what is. The BCV framework allows us to understand capabilities, what they are, and how they change. To do this, we observe the behavior—*doing*—and infer connections and visions.

Third, the distinction between personal, organizational, and regional capabilities—the connections and visions for each level—can be discerned via behavior in context. Visions are the internal aspect of an individual, organizational, or regional agent. When fully internalized, vision becomes embodied in the agent, part of its form that is transparent to its functioning. No effort is required to invoke the vision. Indeed, one can’t help but call it to mind. Behavior occurs without thought. It is the “fast” element of thought (Kahneman, 2011), the “inferential” type of belief (Fishbein and Ajzen, 1975), and is implicit in the agent. It effectively becomes infrastructure—“It is by definition invisible, part of the background for other kinds of work. It is ready-to-hand” (Star, 1999, p. 380). Beliefs about what is and what should be become intrinsic to how one sees the world via internalization. I refer to the general process of incorporating new information into vision and internalizing it as *seeing*.

Connections are an agent’s external aspect. Highly externalized connections require a huge amount of effort, or sense-making (Weick, 1995) and transaction costs (Williamson, 1981) for decision-making (Simon, 1976). This is both what Kahneman (2011) calls “slow” thinking and what Fishbein and Ajzen (1975) refer to as “descriptive” belief. At some indistinct point in these processes, through experience and practice, slow thinking becomes fast, descriptive beliefs become inferential, and connections are internalized into vision. Conversely, sometimes visions must be externalized to create connections, particularly when there are major changes in the
environment. Vision becomes enacted in connections to acquire information and materials, which I refer to as having.

Externalization of vision occurs via learning. Rather, having is learning, or at least part of it. Having is both a demonstration of and means to increase capabilities. The other side of learning is reflection, or seeing. Both having and seeing can results from as well as feed into learning. Having and seeing are, in this conceptual framework, practical aspects of being, along with doing. Doing is the intersubjective aspect of being, having is the objective aspect, and seeing is the subjective aspect. Doing is not just about action; it is about states-of-being. This is illustrated in figure 3, which shows how connections and visions are conceptually integrated in behavior. Externalized information requires inference and behavior happens slowly as one must attend to assets to understand what they are and how they work. Internalized information allows description and behavior happens rapidly as one is able to attend through assets to act in/on the world.

![Figure 3 The Behavioral Space](image)

Behavior changes with externalization and internalization, as connections and visions change. All of this manifests as behavior; indeed, behavior can be seen as an on-going interplay
between externalization and internalization. It also describes how interpersonal relations arise. Vision is manifest in behavior, and persons with complementary behavior connect. Behavior of others with whom one is connected functions as a model, impacting that person’s behavior and influencing her or his visions. These concepts align with philosophical perspectives such as those of Ryle (1946, 2002), Polanyi (1958, 1983), and Habermas (1984), as well as with the views of cognitive scientists such as Baldwin, et al. (1996) and Bargh and Ferguson (2000).

An individual who is highly capable in a particular context does not need to make connections because those connections have already been made, internalized, and incorporated into vision. Therefore he or she is engages in activities and utilizes assets effortlessly—literally, unconsciously recognizing them. An incapable person literally cannot envision how things work or what to do. He or she ends up attending to assets rather than attending through them to do the activities. Or, if the person is marginally capable, he or she attends through the asset to the activity but not to the purpose. For example, someone who is new to a company has a difficult time getting a conference room, getting the projector to work, and getting on the conference call. A more experienced worker can do all of those things but can’t keep attendees on topic or get a decision. A highly capable worker skillfully facilitates the discussion and uses the facilities to get through the meeting. A similar analysis could be conducted of persons in their individual and regional contexts.

This brings me to a final point about behavior: The person is the fundamental object. This dissertation and theory are really all about individual people. An individual manifests personal behaviors-connections-visions (B-C-V), organizational B-C-V, and regional B-C-V that are distinct from each other. Individuals behave collectively as organizations and regions differently than they do individually as persons. Differences in B-C-V between levels emerge as differences
in form and function between levels. Persons have form and function different from organizations. And, organizations have form and function different from regions. Conceptually, individual, organizational, and regional capabilities can change independently (even if, in reality, they never do). The behavior-connection-vision (B-C-V) framework provides a means for assessing changes in capabilities at each level, for correlating those changes to each other, and for ascertaining what causes capabilities to change.

To simplify and summarize, capabilities and knowledge—the dependent variables in this theory and the outcomes of learning are evident in behavior—which is the manifestation of internal visions and external connections. Behaviors, connections, and visions can also be used to describe and measure the independent variables, or inputs, of this theory, which I discuss below. If people learn, they will invariably exhibit particular types of behaviors-connections-visions (B-C-V): liberty, prosperity, and wellness. These result from another particular type of B-C-V, which is commonly referred to as community. Generally, applying and testing this theory involves analysis of what individuals are at the micro, meso, and macro levels. To be valid and verifiable, such an analysis must consider what individuals do (behavior, activities, purposeful actions, etc.), have (connections, assets, information, materials resources, etc.), and say (vision, attention, attitudes, beliefs, perceptions, thoughts).

It is important to note that the precision, reliability, and validity of a measure (or descriptor) depend on specificity. Bandura (2006) makes this point in reference to self-efficacy, but it applies to behaviors and connections, as well as vision (which, in this conceptual framework, encompasses self-efficacy):

There is no all-purpose measure of perceived self-efficacy. The “one measure fits all” approach usually has limited explanatory and predictive value because most of the items in an all-purpose test may have little or no
relevance to the domain of functioning. Moreover, in an effort to serve all purposes, items in such a measure are usually cast in general terms divorced from the situational demands and circumstances. This leaves much ambiguity about exactly what is being measured or the level of task and situational demands that must be managed. (p. 307, emphasis in the original)

Similar can be said of capabilities, freedom, and knowledge, and of community. The more specific one can be about the aspect and context of the individual that is being described or measured, the clearer and more useful that descriptor or measure will be. This conceptual framework is intended to facilitate consistent specification of concepts and operationalization of variables across instances and levels.

Capabilities, Freedom, and Knowledge

Capabilities and knowledge are covered in some detail in the literature review. I also discussed capabilities in relation to levels of analysis. Here I focus on how they fit into and the forms they take my conceptual framework. The capabilities approach (Sen, 1988, 1999; Nussbaum, 2000; Clark, 2005) focuses on functionings, relative to the possible ways one could choose to function, and the factors that enable and constrain those choices and functions. Capabilities are what allow us to respond to innate drives, and capabilities can be constrained or enhanced.

It is questionable whether drives can be definitively defined and differentiated as Ryan and Deci (2000) or Lawrence and Nohria (2002) have done. For one thing, these definitions of drives are different—competing or complementary—from each other and from Maslow’s (1970) taxonomy of needs. Another issue, as discussed by Clark (2005), is that such expert-formulated definitions can undermine capabilities by foreclosing on people’s opportunity to define their
drives for themselves. It is reasonable and useful to propose general areas or aspects of capability (freedom) based on the literature reviewed above (see table 2). This is just a framework.

Conceptually, one or more of the forms of freedom allow individuals to fulfill their drives and live their values. But, individuals are fully able to name their own drives, responses, and guiding values.

My definition of capabilities has two aspects. First is the inherent capacity to process information and materials. Second is acquired ability to utilize capacity for valued outcomes. Capacity is what the individual can accomplish unaided and without tools. It is what we have in Hobbes’s (1651/1994) “state of nature,” or what has been commonly referred to as “nature” in the behavioral sciences. For the sake of simplicity I assume, like Hobbes, that all persons have essentially the same capacity. Ability, in contrast, is similar to “nurture.” It is what we acquire through experience and from others.

Table 2 The Forms and Aspects of Freedom

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<thead>
<tr>
<th>Forms of Freedom</th>
<th>Positive Aspect</th>
<th>Negative aspect</th>
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<tbody>
<tr>
<td>Liberty</td>
<td>Freedom to associate and speak as one sees fit</td>
<td>Freedom from coercion and oppression</td>
</tr>
<tr>
<td>Prosperity</td>
<td>Freedom to benefit from one’s effort and property</td>
<td>Freedom from exploitation and privation</td>
</tr>
<tr>
<td>Wellness</td>
<td>Freedom to life and health</td>
<td>Freedom from disease, injury, and infirmity</td>
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In this framework, capability is simply ability given capacity. Capacity is the quantity of information or materials that can be acquired, handled, managed, processed, etc., over time. Ability is the quality over time. Capacity can be measured in units, whereas as ability must be valued to be measured. For example, an unaided person can carry five regular bricks at one time,
or that person can carry one gold brick; the former is a larger quantity but the latter is more qualitatively valuable.

Freedom, in this conceptual framework, is simply the exercise of choice or preferences, including absence of that which impedes such exercise or presence of that which promotes it. Freedom relates directly to individual persons. It has a wholly physical form (wellness), a physical form in social context (prosperity), and a wholly social form (liberty). Liberty involves freedom of association and expression, or freedom from coercion and oppression. Prosperity involves freedom of ownership and work, or freedom from exploitation and privation. And, wellness involves freedom of health and life, or freedom from disease and injury. Socioeconomic circumstances can enable or constrain freedoms, and can be such that one person’s freedoms are enhanced via constraint of another’s. For example, slave owners’ freedoms are increased by reducing their slaves’ freedoms. These are what I call the positive and negative aspects of freedom.

Generally, a capability allows one to achieve some form of freedom. Indeed, capabilities can be defined as that which increases freedom (which is complementary to, not contradictory of my definition of capability as ability given capacity). There is a multiplicity of capabilities, but we can think of them in terms of drives: as autonomy, competency, and relatedness, as evidenced by acquiring, belonging, and defending. These can be described and measured in terms of behaviors, connections, and visions, and the extent that these aspects of the agent have a positive or negative impact (either by absence or presence) upon areas of freedom. Freedoms are evidence of capabilities in context, described as visions and measured as connections both via behaviors.
An individual’s capacity is assumed to be fixed, given, and practically the same as others’ capacities. Organizations and regions cannot increase an individual’s capacity but they can affect how that capacity is allocated. Higher level social structures can directly meet human needs—can carry out important tasks for individuals—allowing them to do other less critical but higher valued tasks. For example, farms and markets can produce food for individuals so that those individuals can build houses, teach children, write poetry, etc. Organizations and regions can constrain individuals’ capacities by limiting access to nourishment, barring them from the marketplace, enslaving them, etc. Ability is the opposite: Organizations and regions can enhance ability but cannot limit it.

External factors can reduce one’s capacity, resulting in negative freedom, or impede gains in ability. It is more difficult for negative freedoms to reduce ability because ability is, as Frankl (1984) notes, the contents of mind that only the individual can affect. Once you know something it is practically impossible for others to make you unlearn it. On the other hand, external forces can easily enhance ability, but they cannot easily enhance capacity. Note that organizations and regions consist largely of “external factors.” So, conceptually, capabilities and freedoms are closely related but not the same things. One way to look at this is that capacity is objective, ability is subjective, and freedom is intersubjective. The forms of freedom are the outputs of capabilities, the ways in which capabilities are evident.

At least as important as the amount or level of freedom is the extent to which one freedom fosters or must be sacrificed for another—their correlation—may be more important. One might have to sacrifice prosperity for liberty if he or she does not want to be constrained by schedules and tasks dictated by work. Or, one may have to sacrifice health for prosperity in a job that is dangerous, or simply involves sedentary activities. There are three general relationships:
First, each form of freedom could be independent of—rising or falling without impacting—the others. Second, increases or decreases in one form of freedom could have a similar impact on—be positively correlated with—one or both of the other forms. Third, one form freedom could be a trade-off for, negatively correlated with, the others. If it goes up the others go down and vice versa. The subjectively desirable situation is for each form of freedom to complement and promote the others, but this is often not the case. As much as we want to understand what contributes to a particular form, we are even more interested in what causes them to be complementary and to increase.

Knowledge is informed true belief. Or, to be more specific, it is probabilistic judgment about the world—self and environment—that coheres together, is expressed consistently, and corresponds to reality based on signals from the world. The validity of knowledge can be judged by how it encompasses multiple divergent perspectives and by the amount of excess (unshared) information associated with it.

Declarative knowledge is relatively easy to encode, make explicit, and share via documents. Procedural knowledge is relatively difficult to encode, remains largely tacit, and must be shared in person. Between these two forms is implicit knowledge that is built into artifacts and infrastructure. Knowledge can be naturally divided into nine types, which relate to explicit, implicit, and tacit forms. Generally, I refer to this typology as W7TH: Which and whether are types decisive knowledge regarding choices. Why is causal or rational type of knowledge. Who is agentic knowledge, and closely related to spatiotemporal knowledge when and where, because these are all contextual types of knowledge. Indicative, objective knowledge that and manipulative, subjective knowledge how are integrated in the most flexible type of
knowledge, the intersubjective *what*. Figure 4 illustrates how the types of knowledge are interconnected and how they formally manifest in the world.

![Figure 4 The W7TH Typology of Knowledge](image)

Each instance of know-how, know-that, know-what, etc., is what I refer to as a knowledge element, or a knoel. A knoel such as “how to jump” or “because it’s far” have no meaning. Meaning comes from connecting knoels, for example, “jump because it’s too far to step” and “don’t jump because it’s too far” are different ways of connecting these knoels. They imply other connections, such as what is being done—crossing a chasm or a stream—and whether to act.

Knoels are evident in expressions and artifacts regarding what we do (actions, roles), have (possessions, states-of-being), and say (perceptions, thoughts). Know-that in particular, is expressed in these terms. I do *that*: busy work, the polka, etc. I see *that*: a cat in a tree, you are right, etc. I have *that*: a broken heart, a ’57 Chevy, an organization, etc. State of being is not some ethereal, philosophical issue. It is very practical and real. And, it is important to assessing knowledge. States-of-being begin with know-that and become more specific as they are connected to other knoels.
Particular knoels are linked in a complex, dynamic web of associations with other knoels. For example, know-that it is Christmas is linked to know-who about Santa Claus as well as know-what and know-when of Christmas, which depend on know-where (at a holiday party, the mall, or the North Pole?). “Be nice” is know-whether based on Christmas know-why (because you won’t get any presents!). This knowledge links back know-what it means to “be nice”: know-that eating your vegetables, going to bed on time, etc., is nice, and know-how to behave when Santa is watching. Schemata are patterns or general ways of connecting knoels.

 Explicitness, implicitness, and tacitness are characteristics of knoels. Some knoels can be expressed—“That is a reindeer”—and verified and evaluated. Other knoels, such as how to wrap a present, can be enacted and validated (“He is really good at wrapping presents”). The knoels and their connections are explicit in Christmas songs and stories, tacitly communicated by the actions of others, and implicit in rituals associated with Christmas. They are possibly most evident in states of being: doing, having, and seeing. As noted above, this is a practical issue, which I revisit in the section on application and operationalization.

You have know-which about a toy or a lump of coal. Of course you’ll be nice! Figure 4 represents thinking from the abstract and general of know-how and know-that to the concrete and specific of know-whether and know-which (which can be so well embedded in our environment that we don’t have to consciously think and decide, we simply act). Kids have conceptual know-how and know-that about being good, but it’s the other knoels of Christmas—the know-what, -when, -where, -who, -why, -whether, and -which—that drive them to actually be good.

This portion of my conceptual framework—capabilities and knowledge—provides a basis for description and measurement necessary to explore the theory. Capabilities and knowledge are the latent dependent variables in my theory, which are evident as liberty,
prosperity, and wellness. Capabilities and knowledge are means for individuals to achieve their ends; liberty, prosperity, and wellness are those ends. This portion of the theoretical framework allows for more detailed, in-depth analysis that addresses the issues raised in the methodology section. The behavior-connection-vision portion of the framework provides means for valid measures and verified descriptions of capabilities, knowledge, and their outcomes, liberty, prosperity, and wellness. Figure 5 shows how these components fit together.

<table>
<thead>
<tr>
<th>Capabilities and knowledge</th>
<th>Capacity</th>
<th>Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections</td>
<td>Quantity of information, materials, and sources</td>
<td>Quality - Validity (positive or negative)</td>
</tr>
<tr>
<td>Behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visions</td>
<td>Quantity of knowels, relationships, and sources</td>
<td>Quality - Veracity (truth or falsity)</td>
</tr>
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<td></td>
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<tr>
<td>Competence</td>
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Figure 5 Integration of Constructs and Measures

**Competence**

Competence is an aspect of capabilities and knowledge that is particularly important in context and in practice, basically, “The state or quality of being adequately or well qualified … A specific range of skill, knowledge, or ability” (competence, 2000). Competence is primarily procedural know-how, ability to carry out some task and to operate in some setting. There is, of course, declarative knowledge involved in competence. But, the incompetent person who has know-that but no know-how is practically a cliché and stereotype in many settings.

It has been noted that the first step to knowledge is to realize one does not know. Adams (2011) maintains that competence develops through four stages, beginning with not knowing that
one does not know. Once a person becomes aware that he or she does not know it is possible to pursue competence and to become consciously competent. The ultimate stage is to be unconsciously competent. Unconscious competence is essentially what Bransford, Brown, and Cocking (2000) call expertise, and what I discuss as internalization. It is the integration of seeing and doing into being. Bloom’s (Bloom, et al., 1956; Anderson & Krathwohl, 2001) taxonomy is a more comprehensive framework for considering competence, learning activities and artifacts. Bloom’s taxonomy includes cognitive, affective, and psychomotor domains. Increasing competence in each domain is characterized by increasing sophistication, from simply attending to a model or some stimuli, to effective response, to generation of new knowledge.

The primary shortcoming of these approaches to knowledge is that they are inherent to the micro-level. Bloom’s taxonomy is quite practical and well suited to assessment, but it less applicable at the organizational and regional levels, although, Wenger, McDermott, and Snyder (2002) do suggest how this might work. More importantly for present purposes, Bloom’s taxonomy does little to help us understand how the learning at various levels is interrelated. In my framework, competence is essentially an intermediate element between community and capabilities. Competence does not just develop in the context of communities; competence is created by and defined in communities. Competence operates in tandem with roles, rules, and resources that emerge via community, are formalized into organizations, and are reified in regions’ infrastructure and institutions. And, competence contributes to capabilities and freedoms.
Learning

I summarized the literature on learning, above, including definitions of the term and of related terms. Let it suffice to say that learning is the process of gaining capabilities and increasing knowledge. During learning, the mind gains informed true beliefs in the form of interconnected knoels, and liberty, prosperity, and wellness increase. My primary objective here is to highlight qualitatively different forms, or levels, of learning.

Senge (2006) makes the distinction between adaptive (or survival) learning and generative learning. Increasing capabilities for adaptation and survival is important, of course. But, “‘adaptive learning’ must be joined by ‘generative learning,’ learning that enhances our capacity to create” (Senge, 2006, p. 14). “While adaptive learning is possible without vision, generative learning occurs only when people are striving to accomplish something that matters deeply to them” (p. 192). Senge argues that generative learning as a concept is meaningless without clear, strong vision. He also maintains generative learning is a social activity.

When you ask people about what it is like being part of a great team, what is most striking is the meaningfulness of the experience. People talk about being part of something larger than themselves, of being connected, of being generative. (Senge, 2006, p. 13)

Wenger, McDermott, and Snyder (2002) maintain that learning occurs in communities and networks via interplay between accounts of activities and aspirations. The value of learning increases in cycles from the immediate, through what’s possible, to actual application, to impacts, and to changing values. The everyday accounts and aspirational narrative described by Wenger, McDermott, and Snyder equate to the sides vision—aspects of what is and what could be—in this conceptual framework. They see value creation in the tension between accounts and
aspirations. I see gains in capabilities coming from cycles of externalizing vision and internalizing connections; or, in more common terms, cycles of doing and seeing.

Wittrock (1992) presents a different, sub-individual type of generative learning. He would likely agree with Senge’s (2006) take on generative learning, but Wittrock focuses on generating new connections among concepts and between prior knowledge and new information in the mind. He identifies behavior implications for teaching: generally, actively creating materials, rather than passively absorbing information, results in greater retention and understanding. Not to oversimplify, but active learning results in a higher level of learning—in all senses—than does passive learning. It makes new knowledge more meaningful.

To put this in terms of my conceptual framework, creative behavior expands vision, particularly when it is collective behavior. This collective behavior requires connections among the actors, and those connections depend on common or complementary visions. Actors become aware of others’ visions via behavior, generally whether that behavior is active and generative or passive and adaptive. From Senge’s (2006) perspective, generative learning involves externalization of visions into teamwork. From Wittrock’s (1992) perspective, generative learning involves internalization of connections via creative acts. From my perspective, adaptive learning is little more than redeployment of capacity, whereas generative learning substantially increases ability.

In either case, from either perspective, generative learning has greater impact on capabilities than adaptive learning. Thus, it is a higher level of learning. But, it requires capacity to be reallocated. Generative learning also links the levels of social aggregation. Individuals gain more capabilities by actively creating with others than by passively absorbing information. Teams form as individuals create together, giving the group greater capabilities than the
members have individually. The results are akin to March’s (1991) exploring technology versus exploiting it, and to Christensen’s (2006) concepts of continuous, discontinuous, and disruptive innovations. So generative learning appears, in the short-term, to a loss of capabilities, whereas adaptive learning appears as a small increase in capabilities. Long term, though, generative learning results in a large increase in capabilities, whereas adaptive learning can lead to a steep, sudden decrease in capabilities.

Continuous innovation is an incremental improvement in a process that makes a firm more efficient. Such improvements are important, but become irrelevant when there a major socioeconomic shifts. It no longer matters how capable buggy whip makers or cassette tape manufacturers were. Disruptive innovations are entirely new products that fundamentally reshape markets and create new value networks. These are different levels of impacts and responses to change, which obtain at the personal and regional, as well as organizational, levels. Indeed, innovation at the organizational level is generative learning that requires generative learning at the individual level, and benefits from generative learning at the regional level (from organizations creating together).

The fundamental challenge for practitioners and theoreticians is to determine whether a reduction in capabilities is the short-term effect of generative learning—meaning it will lead to a substantial increase in capabilities—or of adaptive learning. Capabilities lost due to adaptive learning are lost forever and must be replaced by other capabilities to avoid an increase in unmet human drives and needs. For this reason, I shall refer to generative learning as substantial and adaptive learning as superficial. A key objective of this dissertation is to help us see the differences between these forms of learning in practice, and to understand how build on superficial learning in order to achieve substantial learning.
Community Functions

Community is the independent variable in my proposed theory. More than that, community is the phenomenon that hypothetically invariably precedes increases in capabilities (i.e., learning). There are communities between and within—so to speak—individuals, organizations, and regions. The fundamental proposition of this theory is that the more robust and stronger the community, the more robust and faster the learning. And this effect multiplies when community exists across levels. Capabilities increase faster and stronger when persons, organizations, and region all contain the same community.

As discussed above, MacQueen, et al. (2001) define community as, “a group of people with diverse characteristics who are linked by social ties, share common perspectives, and engage in joint action in geographical locations or settings” (para. 3). In the context of the behaviors-connections-visions (B-C-V) conceptual framework social ties are shared connections, common perspectives are shared visions, joint action is shared behavior. Geographic locations or settings is shared contexts and imply shared behaviors, connections, and visions. People in the same place tend to do, say, and use similar things simply because they share a context.

The “diverse characteristics” portion of MacQueen, et al.’s definition implies that community members are connected because they are different, not in spite of their differences. Such connections provide access to different resources, different sources of information and different pools of resources; they have high positive valence. Diversity is essentially what Wenger, Trayner, and de Laat (2011) refer to as noise, and is the source of the spontaneity and unpredictability that allows for generation of new ideas and resources. Diversity and all that comes with it must be optimized: Too little and the community becomes calcified and stops operating; too much and the community becomes incoherent and stops operating effectively.
This is essentially institutional thickness or thinness (Amin and Thrift, 1995; Hauser, Tappeiner & Walde, 2007), is similar to the leakiness and stickiness of local knowledge (Brown and Duguid, 2002), and is comparable to balance bonding and bridging social capital (Putnam, 1993).

The fundamental proposition of this dissertation—that community yields learning—isn’t so much about what community is, as its functions, how community operates. McMillan and Chavez (1986) maintain that for people to have a sense of community they must experience membership in, influence on, needs fulfillment by, and shared emotional commitment to… what? They go on to say communities “offer members positive ways to interact, important events to share and ways to resolve them positively, opportunities to honor members, opportunities to invest in the community, and opportunities to experience spiritual bond among members” (p. 14). These are the output functions of community; what community offers to members. The implication is that communities function to optimize noise, institutional thickness, leakiness and stickiness of local knowledge, and bonding and bridging social capital.

Peck (1987) presents a similar, simplified version of the characteristics of community, consisting of commitment, consensus, and inclusivity. In contrast to McMillan and Chavez (1986), Peck sees these as characteristics of how the community operates, rather than members’ perceptions (as McMillan & Chavez (1986) do). Peck suggests that communities develop in four stages from pseudo-community, through the chaos of member conflict, into “emptiness” as members relinquish egoistic expectations, and finally to “true” community. These can be seen as paralleling the phases or stages of many of the cyclic loops of learning models of organizational learning. It also parallels other sequential models of development at other levels, particularly Piaget’s (Piaget & Inhelder, 1958/1999) micro-level model of cognitive development and
Kirkpatrick’s meso-level model of training impacts. Development, though, is much more complex than such models suggest, and rarely occurs in an across-the-board, clear sequence (Papalia, Olds & Feldman, 1998).

Block (2008) suggests that community emerges or is transformed via a series of conversations based on powerful questions. He maintains that the first conversation must be one of invitation, and that this must be followed by conversations about possibility, ownership, dissent, commitment, and gifts in the community. (By “gifts” Block means what each member brings to the community, including what might be typically thought of as a disability.) The conversations must answer questions, “that engage people in an intimate way, confront them with their freedom, and invite them to cocreate a future possibility” (Block, 2008, p. 105). Other than the invitation conversation occurring first, Block says the sequence of conversations is not critical, as long as all the concomitant questions are addressed.

What Peck (1987) and Block (2008) are essentially discussing are the functions via which a group is transformed into a community and generates new possibilities. These are what I term the input functions of community. It may be useful to apply the W7TH model of knowledge to community in order to better understand what these input functions are.

In the W7TH model, know-what is a synthesis of know-how and know-that, ability to affect and identify. So when we ask, “what is community?” we are effectively asking about the facts and functions of community. By looking the other side of what in the W7TH model, we can say community requires know-when activities community occur, know-where community assets reside, and know-who is part of the community. The means for sharing information and materials defines community and those engaged in the sharing. Community is defined by sharing. Community is shared connections, but also shared behaviors and visions.
As a synthesis know-how and know-that, know-what is greater than the sum of its parts. Similarly, community is more than knowing that you share something with certain others and knowing how to share certain things with them, which I would term affiliation, the basis of a network. We affiliate with others out of personal self-interest, as self-agents, creating what Tönnies’ (1887/2001) termed Gesellschaft. In this framework networks are implicit in communities, but a community is more than a network. Communities are not things, but we refer to them as such—“my community” or “the business community.” There is shared identity and people act as agents for that identity, even if it’s not clearly their self-interest, based on mutual respect and common beliefs, giving rise to something like Tönnies’ Gemeinschaft.

Putnam (1993) maintains that prosperity arises from networks of civic engagement, “rich networks of organized reciprocity and civic solidarity” (p 3). Such networks support prosperity in three ways, he says. First, they promote norms of caring and sharing, or “generalized reciprocity: I’ll do this for you now, in the expectation that down the road you or someone else will return the favor” (p. 3). Members of communities help each other without expecting direct compensation. But, members of community expect that if they need help other community members will come to their aid. Second, such networks transmit and respond to information about reputation and trustworthiness, such that “incentives for opportunism and malfeasance are reduced” (p. 4). So, if you take advantage of the communal resources without giving back you will be ostracized. Third, “networks of civic engagement embody past successes of collaboration, which can serve as a cultural template for future collaboration” (p. 4). Putnam makes the important point that the social capital in these networks is a “resource whose supply increases rather than decreases through use and which (unlike physical capital) becomes depleted if not used” (p. 4).
But where do these networks come from, how do they arise? As discussed in chapter 2, Sanders (1975) maintains that a community must:

1. Recruit new members either through birth, in-migration, or annexation, and maintain existing members;
2. Train the new members to play the appropriate roles as they take their places and achieve status in the community;
3. Exert some form of control over individuals who deviate too far from the norm. (p. 192)

These activities involve allocation of resources, roles, power and prestige to members of the community and communication regarding how the community performs allocation. Both functions are essential to recruitment, socialization, and control, and are carried out by connections.

In my conceptual framework, connections transmit information and materials. The amount and usefulness of these resources determine the valence of connections. This is not to say that information and materials necessarily have *positive* value. Connections can have negative valence, transmitting misinformation and junk—i.e., noise—causing negative freedom. Some of this is inevitable, even useful (as discussed in Wenger, Trayner, & de Laat, 2011), in processes of creating and producing; junk and noise can spur substantive learning. But, too much junk and noise can force individuals to act adaptively, limiting opportunity to act generatively (and too little can lull individuals into acting adaptively, limiting intention and motivation to act generatively).

An individual must evaluate connections and their content, balancing certainty and uncertainty, but such evaluation can be costly and risky. A group that can filter the noise and balance it with meaningful content is greatly helpful. It is even better if that group is actively helpful, like Putnam’s (1993) networks of civic engagement. This is what *community does*, and
how I distinguish a community from a network. In a network, each node (person) must evaluate connection in terms of direct benefits. In a community, the nodes validate and verify connections for each other in terms of benefits—actual and potential, direct and indirect—for all.

Vision can only be externalized into connections with positive valence if it is true—coherent, consistence, and correspondent. Community verifies visions. Similarly, connections can only be internalized if they are subjectively, objectively, and intersubjectively valid. Community validates connections. Validation and verification occur via behavior. Community is the context of behavioral changes that accompany internalization-externalization. As community members becomes more liberated, prosperous, and well—as they learn—they are hypothetically better able to contribute to the community and its functions. So, a community’s outputs—what it offers—should improve as the outcomes of behavior improve.

It is also important to note how community does not do what it does: There are few if any formal roles and rules, fully private resources, governance, or hierarchy. People construct and find themselves within communities. Organizations develop from interpersonal interactions within communities. Regions are defined by inter-organizational interactions within communities. It is the flexibility and lack of formality of communities that allow the generative functions that create persons, organizations, and regions. Hypothetically, if and when formal hierarchy, roles, and rules are created for a community, it will cease to be a community and become something else and/or cease to be. Conceptually, hierarchy, roles, and rules enable production of previously defined goods and services (which is akin to adaptive learning or sustaining innovation), but can get in the way of learning, too. They facilitate stability and impede change.
So, in the terms of this conceptual framework, communities enable members to translate vision into connections and capitalize on connections to improve visions. In doing so, people not only gain capabilities and knowledge, they create socioeconomic structures. Community is the primordial soup from which organizations and regions emerge. Community allows us to deal with bounded rationality (Simon, 1991), provides members with economical access to activities and assets, and validates and verifies information and materials for members. This leads to the behavior changes—improvements—that evidence learning. To relate this to key concepts and literature regarding learning at each level, community provides:

- A decision-making aid (Simon, 1976), means for improving sense-making (Weick, 1995), and a way to reduce transaction costs (Williamson, 1981) for organizations
- A medium for interactive learning (Cooke and Morgan, 1998; Cooke, 2002), knowledge spillovers (Audretsch, 1998) for regions, optimizing institutional thickness (Amin and Thrift, 1995; Hauser, Tappeiner & Walde, 2007) and the leakiness and stickiness of local knowledge (Brown and Duguid, 2002)

Now that I have defined community and what it does, the question becomes how does community do these things? What creates community? First, note that this is a process—“A series of actions, changes, or functions bringing about a result … performed in the making or treatment of a product” (process, 2003, para. 2-3)—of community building. Second, note that, since community is not a thing, community does not carry out these functions. People do. Lastly,
before considering what the series of community input functions might be, let us recall that people act agentically. We act in our own interests. While we might work in the community’s interest once it’s established, there must be means and motivations for proto-community to arise. These means and motivations must arise from innate human drives.

So, drive theory is a starting point for thinking about how community operates. Ryan and Deci (2000) identify the basic human drives as resulting from needs for autonomy, competence, and relatedness; Lawrence and Nohria (2002) see the drives to acquire, bond, and defend (and to learn, or improvement in responses to other drives). Ryan and Deci’s drives are states of being (or feelings and perception about one’s state of being), which are internal, passive, and subjective. Lawrence and Nohria’s drives are active, external, and objective. The former maps to my concept of vision and the latter to connection. Ryan and Deci’s drives are based in one’s beliefs about what is and what could be. Lawrence and Nohria’s are about one’s acquisition of information and resources.

If these are the innate drives of human behavior, and community represents a set of behaviors, then community must arise from these drives and, once in operation, must continue to reduce these drives if it is to be sustained. Going back to Ryle (1946, 2002) and Senge (2006), once individuals experience generative connections they know such connections are possible and desirable. “I was part of something, and I want to be part of something.” Thus “being part of something” becomes part of their identities—or at least their vision regarding identity—and they seek to identify others who have similar identities.

I suggest that community has three general input functions that not only build community but also generate capabilities. As shown in table 3, these functions draw on and relate to a range of economic, psychological, and sociological constructs. These three functions describe how
input factors are transformed to create and sustain community. Generally, these functions create and sustain community by increasing their members’ capabilities. Indeed, capabilities, knowledge, and freedom are the result of this process of community building. Liberty, prosperity, and wellness are the output functions.

Table 3 Concepts Related to Community Functions from Various Disciplines

<table>
<thead>
<tr>
<th>Literature Topic</th>
<th>Identification</th>
<th>Integration</th>
<th>Differentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civic engagement (Putnam, 1993)</td>
<td>Reputational information</td>
<td>Generalized reciprocity</td>
<td>Templates for collaboration</td>
</tr>
<tr>
<td>Community (Sanders, 1975) (McMillan &amp; Chavez, 1986)</td>
<td>Recruit new members Belonging</td>
<td>Have members play the appropriate roles Shared emotional commitment</td>
<td>Control members’ behavior Influence and needs fulfillment</td>
</tr>
<tr>
<td>Decision-making (Simon, 1976)</td>
<td>Analysis</td>
<td>Design</td>
<td>Execution</td>
</tr>
<tr>
<td>Learning communities (Senge &amp; Scharmer, 2006)</td>
<td>Research Guiding ideas</td>
<td>Capacity-building Infrastructure</td>
<td>Practice Common work</td>
</tr>
<tr>
<td>Sense-making (Weick, 1995)</td>
<td>Environmental scanning</td>
<td>Interpretation</td>
<td>Guides for action</td>
</tr>
<tr>
<td>Transaction costs (Williamson, 1981)</td>
<td>Searching</td>
<td>Contracting</td>
<td>Coordinating</td>
</tr>
</tbody>
</table>

My concepts of identification, integration, and differentiation are similar to but different from theoretical constructs in social psychology. (They are also similar to the mathematical meaning of these terms.) In this conceptual framework, identification, integration, and differentiation are functions. They things that people do naturally—part of human nature—but
also a relationship between a set of inputs and another set of outputs. Each function describes how the inputs are transformed into the outputs. Identification, integration, and differentiation are behaviors and changes in behavior, which means they also have associated connections and visions. In the following sections I’ll discuss these aspects of each function, and relate the concepts and constructs as I define them to existing theory.

In social philosophy and science, identification, integration, and differentiation are subsumed under role theory. Role theory, based on the seminal works of Mead (1934), Merton (1949), and Parsons (1951/1991), seeks to explain how people are expected to and do actually behave in social situations. My conceptual framework implies a taxonomy of roles: Individuals act in personal, organizational, and regional roles. Building on Merton (1949), problems arise when these roles conflict. Such conflict hypothetically reduces functional capabilities because capacity must be allocated to balancing, making a trade-off, or switching between roles. An important implication of my proposed theory is that such conflicts are minimized—and even become synergies—via community, through a process of identification, integration, and differentiation.
Identification

Identification is a fundamental cognitive operation that involves noting a thing’s separateness from everything else and its distinguishing characteristics, and giving it a name. Identification enables categorization and relation as well as discrimination; it allows us to say what things go together either because they are the same, complementary, or conflicting. For example, we identify retail employees as a group. The employees who stock the shelves are complementary to those who run the register. The employees of one grocery store compete with those of another.

Identification becomes an input function to community when it becomes social. When we self-identify and other-identify, we have nascent community. Thus community depends on prior knowledge of personal characteristics—our own and others—including the extent to which we value relatedness. Identification also depends on our interests and motivations because these determine how and whether we seek others who identify themselves similarly. People connect over specific identity commonalities—liking football, working on a project, living in a certain place. Then they identify themselves collectively, as a group to which others might belong.

So, there are multiple aspects to identification: identification as, identification by, identification of, identification with, etc. Identification involves multiple forms of knowledge: Know-how, know-that, etc., as well as know-who. Identification is derived from prior knowledge and from intentions and motivations. It is evident in connections and visions via behaviors: One’s identity determines what one does, has, and sees, and vice-versa.
Identification is a minimal response to internal and external drives. Depending on circumstances, it might be adequate, or identification may suggest other possibilities, generate new opportunities, and drive more group-oriented behavior. The key is that an individual cannot identify alone, others also have to identify, too. Individuals can only identify together if they share vision, and when they identify together they begin to share connections; they exchange information and materials with each other, but also share means of acquiring information and materials. In the process, the individuals involved will express knowels about their selves, about others, and about perceived commonalities.

Social psychology has developed two theories of identity (Stets & Burke, 2000), one that focuses self-knowledge regarding membership in a group and another that is concerned with how roles are integrated into self-concept. Both involve theory of mind—which is not a theory, per se, but the phenomenon of sense that others have minds and act agentically (Baron-Chohen, 1991). So, identity theories are meta-theories about how we use ordinary, practical theories about others’ minds to connect with others. Stets and Burke (2000) note that in both theories identities are based on social categories, groups, and roles within groups; identification or self-categorization is, according to these theories, how identities are formed. These theories focus on affiliation to an in-group, in contrast to the out-group:

The consequence of self-categorization is an accentuation of the perceived similarities between the self and other in-group members, and an accentuation of perceived differences between the self and out-group members. The accentuation occurs for all the attitudes, beliefs and values, affective reactions, behavioral norms, styles of speech, and other properties that are believed to be correlated with the relevant intergroup categorization. (Stets & Berke, 2000, p. 225)
This is part of what I refer to as integration in my conceptual framework. Beyond the individual integrating into the group, there is the broader phenomenon of the group becoming more coherent and better integrated. Such integration is not easy or simple. It requires models and stimuli to guide individual, and lots of practice.

Integration

Once persons have identified themselves as part of a community (or at least as similar), the question becomes how coherent and formalized the group should be; whether they should integrate as a community. If members envision that they can acquire or defend better via the group, they will tend to integrate (i.e., bond) faster and stronger. Their behavior will manifest as a change in vision, evident in the community-related knowels they express: know-that and know-how derived from know-what based on know-when, -where, and –who, all flowing from know-why, the rationale for the community. In particular, the community must establish rules for behavior. This leads members exhibit more and stronger connections, which should manifest as increased capabilities. Here we see the potential conflict between autonomy (Ryan and Deci, 2000) and bonding (Lawrence and Nohria, 2002). Integration intrinsically reduces one’s drive to bond, and can undermine one’s autonomy. The consequence is that it can be difficult for communities for fully integrate, or they can become over integrated so members have no personal identities, and then they can’t move to the next level.

Integration creates networks, and is evident in new connections, new patterns of transacting information and materials. Integration also involves developing and sharing beliefs and ideas, i.e., visions. Durkheim’s (1897/1997) seminal sociological theory holds that persons who are well integrated into society are less prone to antisocial and destructive (and self-
destructive) behaviors. In my conceptual framework integration provides only weak social controls because networks based on self-interest (as discussed by Wenger, Trayner, & de Laat, 2011) rather than collective agency (prior to integration there is only weak collective identity or sense of community. What Stets and Burke (2000) refers to as having a social identity is integration in my conceptual framework:

Having a particular social identity means being at one with a certain group, being like others in the group, and seeing things from the group’s perspective. (p. 226)

Stets and Burke a distinction between from having a social identity and a role identity, which is more like what I refer as differentiation:

[Having]a particular role identity means acting to fulfill the expectations of the role, coordinating and negotiating interaction with role partners, and manipulating the environment to control the resources for which the role has responsibility. (p. 226)

Feedback and reflection are essential factors for differentiation. These factors are the interpersonal and intrapersonal communications that make individuals aware that their drives have been met—that they are acquiring, bonding, and defending effectively—and builds their sense of community. Feedback and reflection tell an individual if they setting expectations, coordinating and negotiating, and manipulating assets in a meaningful and somewhat unique manner.

Differentiation

If members of a community want to be especially effective at acquiring or defending, they must act collectively. Acting collectively does not mean that everyone does the same thing. It means that individuals perform complementary, mutually supportive roles. These roles need to
be established, along with criteria and a means of accounting for performance. Thus the community—the persons who comprise it—must differentiate. Social psychologists see this occurring, at least in part, from social comparison:

The consequence of the social comparison process is the selective application of the accentuation effect [of similarities with the in-group and differences with the out-group], primarily to those dimensions that will result in self-enhancing outcomes for the self. Specifically, one’s self-esteem is enhancing by evaluating the in-group and the out-group on dimensions that lead the in-group to be judged positively and the out-group to be judged negatively. (Stets & Berke, 2000, p. 225)

Differentiation is especially powerful for addressing members’ drives for autonomy and competence in context, while also enhancing bonds and relatedness. It is something that individuals could not do without community. Differentiation makes community members feel simultaneously outstanding and part of something. Community doesn’t just require individuals to fit in; it enables them to stand out. Drive conflict can arise with differentiation if members feel diminished, pigeonholed, or threatened by differentiation.

Differentiation will be evident in behavior-vision-connections. Individuals will continue to identify the community as such—as a valued thing—but will also identify themselves in new terms relative to the group, for example “I’m the leader,” or “I’m the bookkeeper,” or “I take out the trash,” for the group. Similarly, individuals will continue to share information and materials via and with the group, but they will also develop new connections and begin exchanging new types of information and materials. These new connections will be related to their new, different role, but the information and materials will also be evaluated in terms of the community: purchased 100 roles of toilet paper for, found a new office for, created a logo for, etc., the group.
With differentiation individuals value the group—which has become a community—in terms of what they *contribute* rather than what they derive from it.

On a much broader scope, differentiation was seen in the seminal sociological definition of a system as means of dealing with complexity (Parsons, 1951/1991; Luhmann, 2006). A system has to be as complex as the phenomena with which it must deal with. Luhmann (2006) builds on the work of Maturana and Varela (1980) to suggest that reflexivity, which is integral to theories of identity (Stets & Burke, 2000), is the means by which social systems differentiate themselves.

The implication is that differentiation enables organizations and regions to operate—differentiation is central to the division of labor and nature of institutions—even as it gives individuals subjectively meaningful roles and tasks. These roles and tasks fulfill the individuals’ drives by meeting the needs of the group—now a full-fledged community. Differentiation changes the ways that other must interact with the individual. And, differentiation disrupts the environment around the community and impacts others in that environment to the extent that differentiation fosters organization performance and regional advantage, as well as personal capabilities for other members of the community.

*Cooking the Potato*

So, in order to generate outputs—positive ways to interact, etc.—and allow individuals to reduce their drives, members of a community must (1) identify themselves and their community, (2) integrate into a cohesive and coherent group, and (3) differentiate themselves within the community in ways that generate value, particularly by enabling the community to differentiate itself from the environment. These functions can be seen as integrated into a community building
process, as illustrated in figure 6. My colleague Eleanor Cooper termed this process “cooking the potato” when I first sketched out this process, before even giving each step a name. (The metaphor is apt because there is so much more that can be done with potatoes as they are cooked.)

Each step—identification, integration, and differentiation, as discussed above—in this process—community-building—brings changes in behaviors-connections-visions that represent gains in capabilities and knowledge. As Smelser (1965) pointed out about collective action, each step builds up in a cascading analytical process until together they become sufficient for community. And, we can see these gains go from adaptive and increment gains in the identification process, to generative and disruptive gains in the differentiation process.

One community input function does not necessarily follow the other. Communities lose their identity as a result of too little (or too much) integration, and disintegrate from too little (or too much) differentiation. Identification, integration, and differentiation are levels of community behavior. Each function represents an increase in extent and strength of community. Ultimately, the greatest value in terms of capabilities is realized as each level is flexibly but fully established.
These levels of behavior emerge differently at various levels of socioeconomic aggregation. At the individual level a person experiences various levels of identification, integration, and differentiation with others. The level of community functioning is an aspect of self-concept. It determines how he or she attends to and responds to her or his environment. For organizations, community functions emerge in changes in division of labor, in collective behavior, and in organizational boundaries. At the regional level, community functions determine the buzz that draws in residents (or drives them away).

A Multilevel Theory of Learning

The functions of community—identification, integration, and differentiation—lead to increases in capabilities and knowledge, and mutually-reinforcing relationships between, liberty, prosperity, and wellness. As individuals build communities they improve their personal, organizational, and regional vision, and expand their connections. This gives persons a truer understanding of what is and what is possible at each level, and it increases their access to information and materials.

Community emerges in different forms at each level via the factors that determine outputs at that level. At the personal level community provides better models and support for self-regulation, which increase capabilities. At the organizational level community provides for improvements to division of labor, resulting in better performance. At the regional level community promotes stronger yet more flexible institutions, which fosters knowledge sharing across sectors, and enhances advantages from location and natural resources. Across all levels community facilitates agentic action, reflexivity, and information networks.
At the highest level of community, individuals come to define themselves and their worth vis-à-vis the community. At this level community becomes generative, and the forms of freedom become mutually supportive. Liberty enhances prosperity, which fosters wellness, which promotes liberty. The innate human drives become aligned such that drives for autonomy and to bond, for example, reinforce each other: Persons achieve autonomy by bonding. The functioning of the community takes on greater meaning and value than the individuals’ personal functioning.

In order to reach this level of community, one must invest a great deal of time, resources, and attention in conjunction with others. This can only happen if all share a clear and compelling vision of the future that they believe is not only beneficial but desirable, and not only possible but practical. The highest level of community can only occur if members not only share strong and flexible connections among themselves, but also share connections outside the community (in order to draw in requisite information and materials). Otherwise the community members will be driven to avoid risk and seek short-term gratification, which means they will not make the necessary investment, and the community will breakdown or fail to develop. Or, they will exclude others from the community, undermining its ability to generate new knowledge and contribute to personal capabilities, organizational performance, or regional advantage.

A high level of community at the regional level creates knowledge spillovers that provide organizations in the regional with competitive advantage. It is means to constructed advantage (Cooke & Leydesdorff, 2006). At the organizational level, a high-level of community improves division of labor, which increases performance for those within the organization. Individuals’ capabilities increase as availability of models and support for self-regulation increase with the level of community.
Theoretical Models

I provide three models of learning based on this theory: a causal model, a logic model, and a mathematical model. A causal model shows how the independent variable’s (community) input functions (identification, integration, and differentiation) lead to the dependent variable’s (capabilities) output functions (liberty, prosperity, and wellness). It is intersubjective—useful for practical application and for theoretical testing—and is amenable to qualitative description and quantitative measurement. The logic model is most amenable to qualitative description. It is a subjective version of the theory that is primarily intended for practical purposes, for planning and evaluation. The mathematical model describes the relationships between elements of the theory, and is a basis for quantitative hypothesis testing.

*A Causal Multilevel Model of Learning*

The essence of this theory is that community yields learning. Or, the input functions to community cause increases in the output functions of capabilities, and learning the process of increasing capabilities. The causal model is not a normative statement about what is best, nor is it a hypothetical proposition that can be falsified. It has some aspects of both, and could be interpreted for those purposes. Instead, it is a general view of the way the learning works, synthesized from the literature reviewed in this paper. This model is the result of a virtual dialog among academic disciplines and between theoreticians and practitioners. Of course, the dialog has not *actually* occurred, which is part of this dissertation’s contribution to the field via an applied, trans-disciplinary approach.

The causal model is described in the discussion of levels and units of analysis and variables, above. At the core of this model are community and capabilities, which are clearly
latent, unobservable variables. They are complex, abstract socio-cognitive constructs. There are indicators or mediators of these things—for example, a specific competence may indicate capabilities—but they do not equate. So, if a person is competent at auto repair or computer programming, that does not mean they are prosperous, let alone liberated and prosperous. Or, just because a person refers to her or his neighborhood as “community,” that does not mean the neighborhood substantially contributes to that person’s capabilities. It is important to understand the relationship between these mediating factors, but it is beyond the scope of the present discussion because we are focused on the “big picture” causes of learning. I revisit the issue of indicators and mediators in the discussion section, below.

The input and output functions are more concrete than community and capabilities, and I treat them as observable variables for the moment. These variables need to be further operationalized, which I address in detail in the “Discussion” section. While one might experience identification or liberty, they are not directly observable. I discuss this below, also: We cannot observe identification or liberty but we can observe behavior and states of being associated with these functions. For the moment I will focus on the conceptual, theoretical aspects of the model, illustrated in figure 7.
Simply, identification, integration, and differentiation are functions that create community; they lead to a shared sense of belonging, influence, needs fulfillment, and emotional commitment (McMillan & Chavez, 1986). The strength of each function depends on prior functions: differentiation can only occur among the integrated, and integration can only occur for the identified. The curved arrows from identification to integration and from integration to differentiation indicate this cascade effect. These functions occur at each level. There are personal, organizational, and regional communities. The core issue is not “where” the community is—remember, in this framework, communities are not “things” that have location—but what purposes and topics are invoked in the functions; the behaviors-connections-visions that go into the functions.

At the personal level, community directly impacts capabilities (see figure 7). Each input function directly increases liberty, prosperity, and wellness; reduces drives and needs; and fulfills the individual as a person. Each function also allows individuals greater access to models, stimuli, means of self-reflection, and scaffolding for self-regulation. These are the means to
increasing capabilities, but community and its input functions are the causes. One set of behaviors-connections-visions come in, and identification, integration, and differentiation transform them into very different behaviors-visions-connections.

The personal level community functions are supplemented by similar functions at organizational and regional levels. Of course, personal capabilities contribute to organizational capabilities, which contribute to regional capabilities, but for moral and practical reasons (as discussed above) this theory focuses on how all of these impact individuals’ real freedoms. It is important to understand the causes and factors of organizational performance and regional advantage in order to understand personal fulfillment and individual freedoms. The literature reviewed in this dissertation is not even the tip of the proverbial iceberg on these topics, yet knowledgeable persons would likely admit there are still may questions to answer. This dissertation could help with such questions. An important proposition is implicit in this theory, and particularly in this model: Organizational performance and regional advantage come from fostering personal fulfillment and individual freedoms. Community causes increase in individual freedoms and personal fulfillment. Thus, organizations and regions can improve by cultivating communities within them. I revisit this proposition in discussion section.

On the output end of the causal model, the latent variable capabilities lead to liberty, prosperity, and wellness. As discussed above, the relationships between liberty, prosperity, and wellness are as important as the levels. Hypothetically, the stronger the input factors the greater the positive relationships among the output factors. The causal model shows that there is an interactive relationship between levels. Regions contribute to organizations, which contribute to persons, but causation also goes in the other direction: Persons contribute to organizations, which
contribute to regions. That said, the ultimate unit of analysis is the individual, and the dependent variables are liberty, prosperity, and wellness.

A Learning Logic Model

The logic model of this theory is basically an idealized version of the learning process, of how learning should operate. I theorize that community functions cause or lead to learning. The learning logic model shows how community functions do that, how they are integrated into the learning process. The specific elements of the model—what qualifies as learning activities and assets, or even as outcomes—is contingent and subjective. The content depends on the subject but, theoretically, for learning to occur, learning activities must fit the steps of the model illustrated in figure 8.

<table>
<thead>
<tr>
<th>Antecedents</th>
<th>Inputs</th>
<th>Outputs</th>
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<tr>
<td>a. Personal</td>
<td>b. Organizational</td>
<td>c. Regional</td>
<td>7.c. Regional advantage</td>
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Figure 8 The Learning Logic Model

The primary purpose of the logic model is to qualitatively describe or document increases in capabilities and the activities that led up to those increases. Such a description can be invaluable for evaluating learning, for using during the process to improve outcomes or after the process to assess its efficacy. The logic model is also useful for planning a learning process, for anything from creating a lesson plan to planning a regional economic development project. Of
course, it is a logic model for learning, not planning, so the focus is on freedom outcomes—liberty, prosperity, and wellness—rather than on an event or object.

The logic model makes the role of behaviors-connections-visions (or doing, having, and seeing) explicit. Essentially, behaviors-connections-visions are means to describe, measure, and specify the content of each step in the model. The community functions are implicit in the steps in the logic model: Identification is a natural outgrowth of prior knowledge, intentions, and motivations. Imitating models and responding to stimuli via practice is effectively integration. Feedback and reflection, together, differentiate the community and those within it. I have not discussed the learning process elsewhere, and it is an important part of this dissertation particularly the learning logic model, so I discuss each component is some detail before moving on to describe the mathematical model.

Prior knowledge. Knowledge is what learning is all about, and prior knowledge is the starting point for learning. It is an understatement to say that knowledge has been to topic of a great deal of discussion and study. Rather than attempting to review the voluminous literature on the topic I shall simply build upon the classical philosophical definition of knowledge as justified true belief (Audi, 2010) with more contemporary perspectives, such that:

Humans are viewed as goal-directed agents who actively seek information. They come to formal education with a range of prior knowledge, skills, beliefs, and concepts that significantly influence what they notice about the environment and how they organize and interpret it. This, in turn, affects their abilities to remember, reason, solve problems, and acquire new knowledge. ... In the most general sense, the contemporary view of learning is that people construct new knowledge and understandings based on what they already know and believe. (Commission on Behavioral and Social Sciences and Education, 2000, pg. 10)
Roschelle (1995) maintains that prior knowledge is not just the foundation upon which new knowledge is built, it is the raw material for constructing new knowledge, the lens through which they perceive new knowledge, and “[n]eglect of prior knowledge can result in the audience learning something opposed to the educator’s intentions, no matter how well those intentions are executed” (Roschelle, paragraph 1). Roschelle suggests three assumptions or insights for designers of interactive educational experience:

First, designers should seek to refine prior knowledge, and not attempt to replace learners’ understanding with their own. Second, designers must anticipate a long-term learning process, of which the short-term experience will form an incremental part. Third, designers must remember that learning depends on social interaction; conversations shape the form and content of the concepts that learners construct. Only part of specialized knowledge can exist explicitly as information; the rest must come from engagement in the practice of discourse of the community. (1995, paragraph 27, emphasis in the original)

Bransford, Brown, and Cocking (2000) sum up seminal literature to make many of the same points, noting that, “If students’ initial ideas and beliefs are ignored, the understandings that they develop can be very different from what the teacher intends” (p. 10). Prior knowledge must be analyzed and enhanced, they maintain, as it is built into and transferred to new subjects.

Ability of an organization to recognize new, valuable information (innovation) and incorporate it into practices or processes depends on prior collective knowledge, according to Cohen and Levinthal (1990):

[P]rior knowledge includes basic skills or even a shared language but may also include knowledge of the most recent scientific or technological developments in a given field. [It] confers an ability to recognize the value of new information, assimilate it, and apply it to commercial ends. These abilities collectively constitute what we call a firm’s “absorptive capacity.” (p. 128)
Absorptive capacity builds on diverse general knowledge, problem solving, and learning skills through intensive and repeated exposure. It is different than the sum of individual parts, involving communication across organizational subunits, and within units, as well as from the environment. Christensen (2006) extends prior knowledge to include the value networks in which organizations are embedded. Regional theorists such as Boschma (2005; Boschma & Lambooy, 1999), Cooke (2002; Cooke & Morgan, 1998; Cooke & Leydesdorff, 2006), and Florida (1995) make similar contentions about regions. Over-reliance on prior knowledge can lock firms and regions into technologies, causing them to miss innovations and to socioeconomically decline as the technologies become obsolete.

*Intention and motivation.* Intention and motivation are primary cognitive determinants of behavior, in general, and learning, more specifically, and are fundamentally shaped by self-concept interacting with social circumstance (Heider, 1958; Fishbein & Ajzen, 1975; Bandura, 1977, 1986, 1989, 1997; Ajzen, 1985, 1991; Ryan and Deci, 2000). Generally, intention’s influence is a function of what one believes he or she can do (behavioral control or self-efficacy) and what he or she expects to result from that behavior. Attitudes, beliefs, and norms related to behavior are derived via experience and observation in various social settings. Together, outcomes-expectations and self-efficacy, based on experience and observation, add up to agency, or self-determination, the capability to act on one’s intentions, in one’s own interest: the greater the sense of agency on some topic, the harder and longer one will work toward success.

Scholars have often differentiated between intrinsic and extrinsic motivations, based largely on the works of Deci and Ryan (1985; Ryan and Deci, 2000), between innate curiosity and drive, and enticements and threats from others. Other scholars, particularly those studying second language acquisition, have made a further distinction between behavior as an end or a
means, and between instrumental and integrative motivations (Carreira, 2005). The fundamental issues are the source of motivation—other or self—and motive purpose for the behavior as either a means or end. Self-motivation can be integral to self-concept, or peripheral to what one desires or feels important.

Identification. How we identify ourselves, others, and objects in our environment depends on prior knowledge, and on our intentions and motivations. We are identified by what we do and have, and how we identify others depends on how and what we see.

Models and stimuli. Learning involves a change in behavior. Just as any behavior involves intentions, motivations, and knowledge, so does any change in behavior, particularly intentional, methodical behavioral change. This need not be explicit: there is a natural tendency to imitate behavior, which is reinforced when the observed behavior results in valued outcomes and reversed when it results in undesirable outcomes. Classical conditioning research shows that some stimulus, when associated with a particularly desirable or feared thing, evokes a response appropriate to that thing, even when the thing is not presented (Pavlov, 1927/2003).

In nature, all living beings learn the connection between cause and effect in very practical terms, informing them about dangers and opportunities. Learning by observing others, or modeling, was developed by Bandura (1977, 1986) as a central element of social learning theory. He noted that the learner must attend to the modeled behavior, be able to recall and reproduce it, and have the motivation and opportunity to do so; and similar holds for avoiding undesirable behavior. Collectively, the issue becomes how individuals attend to others as they respond to models and/or stimuli, how does one change her/his behavior in response to the behavior of others, and how are autonomy and relatedness balanced by competency?
Practice. Practice, as related to learning, typically means “repeated performance or systematic exercise for the purpose of acquiring skill or proficiency” (practice, n.d.). But other definitions of the term—“habitual or customary performance ... habit; custom ... the action or process of performing or doing something ... the exercise or pursuit of a profession or occupation” (practice, n.d.)—involve acquisition or creation of knowledge and potential for different behavior, or learning. Practice involves components similar to those involved in modeling: awareness of what the behavioral ideal is, breaking it into components, repetition of those components, integrating those components into a performance, and continuing the enhance the performance (cf., Moretti, 2009).

Practice is essentially the process and result of habituating behavior to the point that ceases to depend on a model or stimulus. It is the difference between a novice and an expert. Bransford, Brown, and Cocking (2000) discuss the differences between novices and experts, beginning with several fundamental principles of expertise:

1. Experts notice features and meaningful patterns of information that are not noticed by novices.
2. Experts have acquired a great deal of content knowledge that is organized in ways that reflect a deep understanding of their subject matter.
3. Experts’ knowledge cannot be reduced to sets of isolated facts or propositions but, instead, reflects contexts of applicability: that is, the knowledge is “conditionalized” on a set of circumstances.
4. Experts are able to flexibly retrieve important aspects of their knowledge with little attentional effort.
5. Though experts know their disciplines thoroughly, this does not guarantee that they are able to teach others.
6. Experts have varying levels of flexibility in their approach to new situations. (p. 31)
To relate this back to earlier discussions, experts have fully integrated their knowledge into their behaviors such that intention is coincident with action, and motivation ceases to be an issue because the behavior is so automatic and natural that it needs no motivation. It is simply part of the expert’s identity. It is fully internalized. Where novices struggle to remember facts and rules, experts organize their knowledge around “big ideas,” enabling them to see patterns in and deal handily with novel situations, and transfer their knowledge to others in other settings (Bransford, Brown, and Cocking, 2000).

The issue for collective learning is how expertise is dynamically distributed throughout the group. How practice is defined within the group, executed by its members, and structured for the purpose of improvement? How does the method allow the group, as a whole, to move from rote application of rules to knowledge organized around big ideas.

*Integration.* Practice is the means for integrating new knowledge into one’s capabilities. It is also the means by which one becomes integrated into a group. Models and stimuli—once identified—inform the individual about appropriate, expected behavior. As a group practices, its members become more integrated and more able. They begin to find meaning in their collective activity. So, integration feeds back to prior knowledge, to motivations, and to intentions.

*Feedback and Reflection.* Feedback is the phenomenon of and process by which current action is informed by the results of past actions. It is essential to control systems of all sorts, including biological, cognitive, mechanical, and social. Feedback tells whether our behavior is acceptable or effective. Reflection is a more complex and richer version of feedback for conscious entities, whereby they consider the nature and implications their actions. Askew and Lodge (2000) maintain that “[f]eedback is a complex notion, often embedded in a common-sense and simplistic dominant discourse” (pg. 1) about education, but “effective learning must include
a wider conception of feedback ... challenging the implicit assumptions on which approaches to feedback are based, and touch on a bigger question – what is ‘effective’ learning?” (pp. 2-3).

Feedback which is intended to provide information and increase understanding is necessary when something is not for negotiation, when it is important to relate rules within a social context or social conventions regarding work and behaviour, and to indicate the consequences of complying with conventions. But where we want to engage people in a deeper process of understanding, making connections, further insights or learning about their learning, this form of feedback is less effective. (pg. 6)

They suggest that models of teaching must be expanded to include facilitating discovery of new knowledge, encouraging reflection, and practicing collaborative dialog. The view of learning implicit in these models “involves making connections between old and new experiences,” incorporates the emotional and social with the cognitive, and includes meta-learning. Where the dominant model of education views feedback as a gift from the teacher to student, Askew and Lodge (2000) tell us, expanded approaches use feedback as a two-way process for description and discussion, illuminating learning and connecting participants.

Argyris and Schön (1978) developed these concepts outside the realm of education as the means for moving beyond simply detecting and correcting errors, and by Senge (2006), as means to enhance capabilities to create. One strategy is to simply make minor modifications to behavior until error is no longer detect. A more sophisticated and powerful strategy, Argyris and Schön observe, is to reconsider the assumptions and explanations upon which one’s behavior is based, which they refer to as “double loop” learning: “Double-loop learning occurs when error is detected and corrected in ways that involve the modification of an organization’s underlying norms, policies and objectives” (p. 3). It involves meta-learning and restructuring connections.
Senge (2006) presents a different kind of double loop, in which reinforcing feedback promotes behavior and balancing feedback attenuates it. Seeing and structuring such interacting systems requires ability to construct mental models, achieve personal mastery, develop shared vision, and engage in team learning, all of which depend on systems thinking, understanding not only the pieces but how they—including feedback—fit into the whole. Reflection is critical to rebuilding mental models, to intentionally thinking different, to include entire systems. In Senge’s view, feedback is an essentially mechanical process, whereas reflection is the means for understanding the effects of feedback.

Schön (1983) notes that problems rarely present themselves in simple, unambiguous situations. Consequently, it is often necessary to construct the problem, exploring the problem setting, via practical experiments. The results comprise feedback that is more nuanced and useful than Askew and Lodge’s “gift” feedback or Senge’s double loop feedback because it emerges organically from practice. Schön describes this integration of feedback and reflection with the example:

When good jazz musicians improvise together, they also manifest a “feel for” their material and they make on-the-spot adjustments to the sounds they hear. Listening to one another and to themselves, they feel where the music is going and adjust their playing accordingly. (p. 55)

**Differentiation.** Schön’s quote describes how jazz musicians integrate as a group, but it also implies—particularly for anyone who is familiar with jazz—how members differentiate. The bassist, drummer, and pianist all have complementary yet distinct roles. Other instrumentalists—sax, horns, guitar, etc.—add to the performance in unique ways. It is the differentiation that determines impacts and contributes to personal freedoms. Differentiation cannot occur without integration, and identification before it. But it is this last function that makes community truly
meaningful and valuable to its members. And, it is differentiation that those outside the community identify the community and by which the evaluate it. There is nothing that makes a person want to play jazz like seeing a truly talent jazz musician step out and play a solo. That is true freedom!

_Multilevel Learning Logic._ The underlying principle for a learning logic model is that all content and ultimate outcomes must be put in terms of individual freedoms. While it may be useful to consider how personal fulfillment contributes to organizational performance, and how that contributes to regional advantage, ultimately we must ask how all other these contribute individual freedoms. There are two general ways to accomplish this with the learning logic model. The first, as illustrated in figure 8, is to simply incorporate personal, organizational, and regional behaviors-connections-visions into descriptions/specifications of each step in the model. While this approach is conceptually simple, it could easily become impractically complex.

The second approach is basically that of Cooksy, Gill, and Kelly (2000); Yang, Shen, Cao, and Warfield (2004); and Beer and Reed (2009): Multilevel case studies. But, where their studies aggregate up—micro feeds into meso, which feeds into macro—the learning logic model cascades down: regional learning enables (or constrains) organizational learning, which enables (or constrains) personal learning. Under this approach the learning logic model is to conduct one or a few regional case studies (or plans), several case studies of organizations in each region, and multiple case studies of persons in each organization. Then the learning logic model can be used to identify differences and similarities between cases at each level and between levels.
A Mathematical Model of Multilevel Learning

The mathematical model is a set of propositions about the relationships between elements of the theory: how variation in the independent variables explains variation in the dependent variable. The mathematical model discussed below, more than the causal model and logic model I presented above, addresses the issue of levels. Each level is embedded in the higher level such that variation between persons is the same as variation within organizations and/or regions. The purpose of this mathematical model is to allow the theory to be quantitatively tested. In order to advance our understanding how learning occurs it is useful to test hypotheses about similarity between learning at different levels of socioeconomic aggregation, and about how learning at one level affects learning at other levels.

The measures and data used in this model, as with the constructs and variables I lay out in this study, must be empirically validated. The model and its outputs might be useful in decision-making after it has been rigorously tested and consistently supported (not falsified) in a variety of settings. Even then, because this is a general, highly abstracted version of the theory, much work will need to be done to achieve more detailed and nuanced understanding.

Actually, what I present here are two different mathematical models, one descriptive and one explanatory. The descriptive model, summarized in figure 9, is a mathematical restatement of the levels of analysis discussion, above. To recap: Capabilities are a function of capacity, which is determined by physical form and is practically fixed, and by ability, which is determined by socio-cognitive functions. Capacity of a unit (person or organization) can be impeded and supplemented by higher levels adding more units, but it cannot be increased. Ability can be developed and utilized by higher levels, but cannot be diminished.
As with all models in this dissertation, the unit of analysis is the individual, and the general question for this model is, “What explains variation in individual freedoms?” While, it may be useful to understand how lower level factors—individual freedoms and personal fulfillment—contribute to organizational performance and/or regional advantage, my concern here is with what maximizes the capabilities of individual human beings. My general purpose is to promote freedom through learning, and that can only be accomplished by focusing on the individual. It is only by and for individuals that we can build better organizations and regions. Personal fulfillment is equivalent to individual freedoms.

Figure 9 shows personal fulfillment as a function of personal capacity, personal ability, organizational performance, and regional advantage. Organizational and regional capabilities can constrain personal capacity and/or enhance personal ability. Regional capabilities can either
constrain an organization’s capacity (capital and labor) or enhance its ability (division of labor and technology). The combination of ability and capacity explains variation within levels—between persons within organizations and regions, and between organizations within regions.

Equation 1 puts this in mathematical terms. Individual freedoms and personal fulfillment (which are equivalent) are represented by \( y_{ijk} \). This is an observation (measurement of some salient action/asset) of the \( i \)th individual in the \( j \)th organization in the \( k \)th region are. The intercept, \( \beta_{0ijk} \), represents the personal capacity, which is assumed to be fixed—although, conceptually, it is constrained by negative coefficients by organizational and regional variables—and the same for all individuals. \( x_{1ijk} \) is an observation of personal ability and \( \beta_{1ijk} \) is the slope coefficient, representing the relationship between \( \{y, x\} \), between measurements/observations of ability and freedoms/fulfillment. \( x_{2jk} \) and \( x_{3k} \) are organizational and regional capabilities (or, at least, particular measurements/observations of indicators of capabilities), respectively, and \( \beta_{2jk} \) and \( \beta_{3k} \) are the slope coefficients. A key empirical and practical issue is whether these coefficients are positive or negative. The error term, \( e_{ijk} \), represents unexplained variation in personal fulfillment/individual freedoms. It is assumed to have a mean of zero and constant variation across all persons/individuals.

\[
y_{ijk} = \beta_{0ijk} + \beta_{1ijk}x_{1ijk} + \beta_{2jk}x_{2ijk} + \beta_{3k}x_{3ijk} + e_{ijk} \quad (1)
\]

Essentially, what equation 1 says is that variation in individual freedoms and personal fulfillment are explained by individual capacity, individual ability, organizational performance, and regional advantage. Equations 2 and 3 describe variation in organizational performance and regional advantage. Equation 2 basically indicates that variation in organizational performance is explained by capital and labor (organizational capacity, \( \beta_{0jk} \)); division of labor and technology
(organizational ability, \( \beta_{1jk}z_{1jk} \)); and regional capabilities (\( \beta_{3k}x_{3k} \)). Equation 3 is a similar explanation of regional advantage: Environment, infrastructure, and location (regional capacity, \( \beta_{0k} \)) and institutions (regional ability, \( \beta_{1k}a_{1k} \)) explain its variation. The primary structural difference between these two equations and equation 1 is that \( \beta_{0jk} \) and \( \beta_{0k} \) are randomly varying rather than fixed. That is, while we can assume that individuals all have the same capacity, we cannot make the same assumption about organizations and regions.

\[
x_{2,jk} = \beta_{0,jk} + \beta_{1,jk}z_{1,jk} + \beta_{3k}z_{3k} + e_{jk} \quad (2)
\]
\[
x_{2,jk} = \beta_{0k} + \beta_{1k}a_{1k} + e_{k} \quad (3)
\]

So, if we assume that organizational and regional capacities vary, what explains that variation? Organizations have various sets of capital and labor. Each region has an environment, infrastructure, and environment that are different from any other region. Both organizations and regions are socio-cognitive constructions. People, using their capabilities, build them. So, variations in organizational and regional capacities—capital and labor; and environment, infrastructure, and location—are explained by the individuals that comprise them.

\[
\beta_{0,jk} = q_{00} + q_{01}y_{ij} + u_{0,jk} \quad (4)
\]
\[
\beta_{0,jk} = q_{00} + q_{01}y_{ijk} + q_{10}x_{2,jk} + u_{0k} \quad (5)
\]

Equation 4 indicates that organizational capacity (capital and labor, symbolized by \( \beta_{0jk} \)) is determined by the overall mean for measurements/observations of individuals over organizations (\( q_{00} \)) and the capabilities of individuals in that organization (\( y_{ij} \)), and \( q_{01} \) is the coefficient of relation between individual capabilities and organizational capacity. Equation 5 shows a similar
explanation for variation in regional capacity (environment, infrastructure, and location), except
that it includes organizational capabilities (ϕ00y2jk).

These equations describe how capabilities at various levels are related. But they do not
explain how capabilities change. This theory explains learning as a result of community input
functions—identification, integration, and differentiation—across levels: Gains in capabilities
are caused by extent and strength of community. While there are personal, organizational, and
regional communities, community functions extend across and connect these levels.
Hypothetically, the more extensive the reach of a community is, the greater its learning potential.
It is community that determines how higher-level activities and assets impact lower level
capabilities, enhancing abilities or impeding capacity.

Equation 7 appears to be the same as equation 1 but it represents very different variables. $y_{ijk}$ still represents capability but here it is an observation of individual in the $i$th differentiation
function from the $j$th integration from the $k$th identification function. So, here the levels are
levels of community. This equation basically says that the stronger the community input
functions are the greater the resulting capabilities are. Equation 6 states this in non-mathematical
terms. $\beta_{0ijk}$ in equation 7 represents capabilities without community, which is essentially the
same as capacity (capability with no ability), so it is the same as the intercept coefficient in
equation 1. And, $x_{1ijk}$ in equation 7 represents measurements of differentiation, and $\beta_{1ijk}$ is the
effect that differentiation has on capabilities (how much of the variation in $y_{ijk}$ is explained by
variation in $x_{1ijk}$). $x_{2jk}$ and $x_{3k}$ in equation 7 represent measurements, respectively, of integration
and identification.

$$\text{Capabilities} = f (\text{Differentiation, Identification, Integration})$$

(6)
\[ y_{ijk} = \beta_{0ijk} + \beta_{1ijk}x_{1ijk} + \beta_{2jk}x_{2jk} + \beta_{3k}x_{3k} + e_{ijk} \]  \hspace{1cm} (7)

Equations 8 through 13 break this down further. They show how the community input functions are embedded in each other. Equation 8 shows that the extent to which differentiation explains variation in capabilities is a function of integration as well as feedback and reflection. In equation 9, which states this in mathematical terms, \( x_{1ijk} \) represents measurements of feedback, \( x_{2ijk} \) are measurements of reflection, and \( x_{3jk} \) represents measurements of integration. The intercept, \( \gamma_{0ijk} \), represents the effect of differentiation on capabilities without integration, feedback, or reflection, which is 0. The regression coefficients—\( \gamma_{1ijk}, \gamma_{2jk}, \text{ and } \gamma_{3jk} \)—are the effects that integration, feedback, and reflection have on capabilities via differentiation.

Equations 10 and 11 illustrate that integration is embedded in identification in the same way that differentiation is embedded in integration. Equations 12 and 13 indicate that identification is a function of prior knowledge, and motivation.

Differentiation = \( f \) (Integration, feedback, reflection) \hspace{1cm} (8)

\[ x_{1ijk} = \gamma_{0ijk} + \gamma_{1ijk}x_{1ijk} + \gamma_{2jk}x_{2jk} + e_{ijk} \]  \hspace{1cm} (9)

Integration = \( f \) (Identification, models & stimuli, practice) \hspace{1cm} (10)

\[ x_{2jk} = \phi_{0jk} + \phi_{1jk}a_{1jk} + \phi_{2jk}a_{2jk} + \phi_{3k}a_{3k} + e_{jk} \]  \hspace{1cm} (11)

Identification = \( f \) (prior knowledge, intention & motivation) \hspace{1cm} (12)

\[ x_{3k} = \tau_{0k} + \tau_{1k}b_{1k} + \tau_{2k}b_{2k} + e_{k} \]  \hspace{1cm} (13)

The implications of these equations are simple. An individual’s capabilities are correlated with her or his experience of community. The strength of that is determined by identification, integration, and differentiation of members at the personal, organizational, and regional levels.
Individuals must experience integration to experience differentiation, and must experience identification to experience integration. What then is the difference between capabilities and community? Capabilities inhere to the individual; community is a collective experience, which must be shared by all members.

There is one more aspect of the mathematical model, which is described in equations 14 through 21: Capabilities are correlated with liberty, prosperity, and wellness. And, liberty, prosperity, and wellness are correlated with each other. In the ideal situation, the regression coefficient with each output function of capabilities on each other is positive; they are mutually reinforcing. In the worse situation, they are trade-offs and the regression coefficients are negative. If liberty, prosperity, and wellness have no effect on each other, the regression coefficients would be zero.

\[
\text{Capabilities} = f(\text{Liberty, Prosperity, Wellness})
\]

\[
y_i = \beta_{0i} + \beta_{1i}x_{1i} + \beta_{2i}x_{2i} + \beta_{3i}x_{3i} + e_i
\]

Liberty = \(f(\text{Prosperity, Wellness})\)

\[
\beta_{1i} = \gamma_{0i} + \gamma_{2i}x_{2i} + \gamma_{3i}x_{3i} + u_i
\]

Prosperity = \(f(\text{Liberty, Wellness})\)

\[
\beta_{2i} = \phi_{0i} + \phi_{1i}x_{1i} + \phi_{3i}x_{3i} + u_{2i}
\]

Wellness = \(f(\text{Liberty, Prosperity})\)

\[
\beta_{3i} = \tau_{0i} + \tau_{1i}x_{1i} + \tau_{2i}x_{2i} + u_{3i}
\]

This mathematical model describes how personal, organizational, and regional learning relate to each other, and how community and its input functions relate to capabilities and its output functions. The learning logic model describes the process by which community is built.
and how that results in increased capabilities (individual freedoms and personal fulfillment). The causal model describes how community invariably precedes increases in capabilities.

While the mathematical model is conceptually more amenable to testing than the other two models, it contains variables that are not so easy to operationalize. This is because it considers capabilities as the result of capacity and ability, rather than knowledge (which can be described via knoels) or real freedoms (which can be observed). The two general approaches that one might take to operationalizing these variables objective and subjective. The objective approach would be to define the variables in economic/financial terms. Capacity, in this approach, would be the cost or replacement value of what each level has, e.g., infrastructure, natural resources, equipment, facilities, labor, etc. Ability would be the functional value—costs avoided or revenue generated—with these assets. The subjective approach would be to develop scales for subjects to rate the capacity of resources available to them and their (or others) ability to use those resources. I discuss these approaches more in Chapter 5.

Summary

Community makes people smarter and increases real freedoms. But, community is not a thing. It is a set of psychosocial functions that operates differently at different levels; not because the functions are different, but because the levels are. Metaphors at each level—individual cognitive constructor, organizational loops of learning, and regional triple helix—point to integrative theory. They provide the bases for a theory of composition for independent variables. Capacity and ability at the individual/personal level have equivalent factors at organizational (capital & labor, division of labor & technology) and regional (environment & infrastructure, and institutions) levels. Learning requires capacity (quantity of information & materials over time) to
increase ability, which means a temporary decrease in capability during the learning process. Dependent variable(s)—real freedoms—liberty, prosperity, and wellness are objective and only pertain to individuals. Personal fulfillment is the subjective version of this. Organizational performance and regional advantage are intersubjective versions. All of these can be described in terms of vision, measured in terms of connection, and are evident in behavior.

These factors are independent across levels, which is essentially what distinguishes the levels: Regional advantage does not necessarily translate into organizational performance or personal fulfillment, or vice versa. My proposed theory suggests that community functions link, as well as contribute to, capabilities across levels. So, based on this theory, we would predict that the more pervasive and stronger community functions are at multiple levels, the more rapid and sustainable the capability gains will be.
CHAPTER V
DISCUSSION AND CONCLUSION

Literature on Learning at Micro, Meso, and Macro Levels

There are distinct bodies of theoretical literature regarding learning by individuals, organizations, and regions. All three bodies of literature deal with how knowledge is acquired, applied, and created. There are other overlaps, as discussed in Chapter 2. Theoretically, each level involves entities acting in their own interests. Another common concept is that the agents are embedded in information networks. An implication is that agents also act in the interest of others as they exchange information. Information networks are simply patterns of transactions. The third theoretical overlap between levels is that agents are aware of, reflect on, and modify their actions based those reflections. This reflexivity is essential to agentic action, and is enabled by information networks. All of the literature is about individual human beings, their agentic action, reflexivity, and information networks.

Beyond their common concern and common underlying concepts, texts about learning can be divided into three bodies based on level of analysis, the context of individual action as persons, organizations, or regions. I refer to these as the micro, meso, and macro levels. Most of literature advances and/or refutes particular concepts or metaphors regarding how learning occurs at one level. The literature includes a wide range of outputs, or dependent variables, and inputs, or independent variables, for each level. These diverse variables can be boiled down to a
few core constructs based on the recognition that learning is essentially an improvement or increase in the output resulting from modifying a fixed set of input factors.

At the micro level, the overarching metaphor is that of a human “machine” cognitively constructs itself and its world, which I refer to as the “cognitive constructor.” While the concept of agentic action appears throughout the literature, this metaphor exemplifies this concept. Individuals generally act to achieve fulfillment as persons based on models and stimulus/reinforcement. Individuals learn directly from models and stimulus/reinforcement, or indirectly from texts about these things. For example, an individual might learn to dance by imitating others, watching videos, and being told he or she dances nicely, which give her or him a sense of personal fulfillment. Thus, personal fulfillment is the output produced by cognitive constructors from information derived from models, stimulus/reinforcement, and texts about these things.

The metaphor at the meso level is “loops of learning,” which involves groups of cognitive constructors repeatedly working together to improve their organizations. This metaphor illustrates the concept of reflexivity. Individuals act together as organizations to increase their collective performance, as determined by the ways they arrange available capital and labor. Technology is essentially these arrangements compiled into replicable, standardized forms. For example, a restaurant performs well if it has employees, quality foodstuffs, equipment, and a well-located building, but only if those employees know what to do, how to work together, and technologies for managing the restaurant and its funds. These things don’t simply appear; they must be acquired, developed, and maintained through an iterative process. So, organizational performance is produced via loops of learning based on capital, labor, and technology.
The macro level metaphor is the “triple helix” formed by loops of learning from various economic sectors interacting within a geographic region. The concept of information networks is especially important to this metaphor. The output of this interaction is that those within the region have an advantage over those in other regions. The advantage is derived from the region’s infrastructure and institutions, which translate physical characteristics of the region into usable resources. For example, a river becomes a transportation asset, potable water, and a source of electric power only via interaction between public agencies, private corporations, and academic institutions. Effective utilization of transportation, water, and power that gives those around the river an edge over those around other rivers requires an even higher level of interaction. This illustrates how the triple helix produces regional advantage from infrastructure, institutions, and resources.

The gap between literature on individual learning, organizational learning, and regional learning is twofold. First, there appears to be no theory that is applicable at the micro, meso, and macro levels. If we can say that learning occurs at all levels, then it stands to reason that there should be a consistent explanation of this phenomenon that applies at all levels. In addition, there appears to be no conceptual framework that applies equally to all levels, which would make it difficult to develop a theory that applies to all levels. (There are the concepts of agentic action, information networks, and reflexivity, but I have found no literature that integrates them into a theory of learning that applies to multiple levels of social aggregation.)

The second gap between theories of individual, organizational, and regional learning regards the relationship between learning at different levels. There seems to be no complete theory about how learning at one level affects learning at other levels. So, for example, does an increase in capabilities of an organization necessarily involve an increase in the capabilities of
individuals within that organization or of the regions in which the organization operates?

Coleman (1988) and Upton and Egan (2010) partially address the relationship between learning by individuals and organizations, but their theories are not comprehensive, nor do they address regional learning. Bapuji and Crossan (2004) and Morse (2004) note this gap. I contend that these gaps can only be filled simultaneously, that we cannot understand how learning at different levels relate until we are clear about how they are similar, about how improvements in persons, organizations, and regions can all be validly characterized as learning.

A Conceptual Framework, Theory, and Three Models

The first step in filling the theoretical gaps is to recognize structural similarities across scale. Persons, organizations, and regions, I maintain, all have behaviors, connections, and visions. Or, more accurately, individual human beings have behaviors, connections, and visions that can be ascribed to them personally, to their organizations, and to their regions. Behaviors, connections, and visions are not separate things; they are different aspects of a system. In other words, a system is formally defined by the behaviors, connections, and visions individuals ascribe to it.

Visions are the internal, subjective aspect of individual human beings. These are their attitudes and beliefs about what is beneficial, desirable, possible, and practical. Connections make up individuals’ external, objective aspect, via which they acquire the information and materials they need to operate. Behaviors are individuals’ intersubjective aspect, which bridges the internal and external. Behaviors are the interchange between connections and visions.

I should explicate an implicit point: The unit of analysis in this theory is the individual human being, her or his behaviors, connections, and visions. This is because (a) we cannot
observe persons, organizations, or regions except through individual B-C-V and (b) because to do otherwise would involve the morally dubious practice of treating individuals as means to regional, organizational, and even personal ends. To put this another way, individuals are the sum of the personal, organizational, and regional B-C-V, and this theory presumes that personal, organizational, and regional activities and assets exist to benefit individuals.

Together behaviors-connections-visions (B-C-V) define what a psycho-social system is. Behaviors are evidence of what persons, organizations, and regions do, their activities. Connections are evidence of what they have, their assets. And, visions are evidence of what they say, in expressions about what they are. Of course, connections and visions can only be evidenced (observed) indirectly via behaviors.

Systems (and statements about them) are verified by B-C-V that are coherently enacted and expressed, consistent with other B-C-V of the system in question and others like it, and that correspond to reality. So, for example, an individual’s role in an organization is verified if he or she can clearly describe the role, if others describe it similarly, and if he or she actually processes the information and materials of that role. Connections can be measured via behavior, by measuring information and materials and the ways in which they are processed. Visions are described by behaviors, by what I call knoels—short for knowledge elements—which are simply information chunks regarding how, that, what, when, where, who, why, whether, and which.

B-C-V provides the metrics for the theory I propose. It is a means for consistently describing and measuring persons, organizations, and regions. Differences in B-C-V define the micro, meso, and macro, but it is not the theory or even the central constructs or variables of the theory.
The theory is essentially quiet simple: community yields learning. This theory involves somewhat different definition of community, although my definition fits well in the diverse and often indefinite definitions of the term. For the purpose of this theory, a community is not a place or a thing. Instead, it is a phenomenon and a process. Drawing on theories of community (Sanders, 1975; McMillan & Chavez, 1986; Putnam, 1993; Senge & Scharmer, 2006), I suggest that three sociocognitive functions make up community: identification, integration, and differentiation. Identification involves recognizes others as similar to self, and that others and self are part of a group. Integration is the adoption of similar idioms, language, norms, rituals, etc., and interacting with each other. Differentiation is the phenomenon of individuals filling unique and valuable roles within the group. These functions also parallel theoretical sociocognitive functions from economics (Williamson, 1981), psychology (Simon, 1976; Ryan & Deci, 2000; Lawrence & Nohria, 2002), and sociology (Weick, 1995). Identification, integration, and differentiation are the independent variables in my theory, and impact capabilities to the extent that they culminate in community.

The dependent variables in my theory are liberty, prosperity, and wellness, which I refer to as real freedoms. These variables are derived from the human capabilities approach to economic pioneered by Sen (1988, 1999; Nussbaum, 2000; Clark, 2005). Essentially, this approach breaks from much of economics by suggesting that the ultimate measure of value is not utility but freedom, which is practically measureable unlike utility, and it equates capabilities with freedoms. I go a bit farther to define capabilities as ability given capacity. Capacity is the quantity of information and materials a system can handle, and is determined by its physical components. Ability is quality of information and materials a system can handle, which is
determined by how the physical components are arranged and employed. Capacity is how much. Ability is how well.

The dependent variables represent the intersubjective, objective, and subjective aspects of capabilities. Liberty is the subjective capability to associate with others and express oneself freely. It is freedom from coercion and persecution. Prosperity is the intersubjective capability to benefit from one’s efforts. It is freedom from exploitation and privation. Wellness is the objective capability to function as a living creature. It is freedom from disease and infirmity. These not only have sound philosophical basis, they are easy to describe and are eminently measureable via B-C-V. Another aspect of these output factors is their relationship to each other. Liberty, prosperity, and wellness can be complementary—each promoting the others—or mutually exclusive. Increasing one at the detriment of another—becoming more prosperous by sacrificing one’s liberty or wellness, for example—represents a superficial form or learning. Substantial learning occurs when the real freedoms feed into and foster each other.

My proposed theory is that community makes people smarter. People make better, more productive decisions and act in their own interests more effectively than they would in the absence of community. To state this in terms of my variables: liberty, prosperity, and wellness become complementary and grow where identification feeds into integration and integration results in differentiation. Or, more simply community improves and increases capabilities. The stronger the community input functions are, the stronger the capability output functions are. This is learning. There are numerous factors in learning, but the extent to which those factors are translated into capabilities—into liberty, prosperity, and wellness—is determined by the community input functions: identification, integration, and differentiation.
I draw on the literature on theory- and model-building (especially Dubin, 1969, and Jaccard & Jacoby, 2010) and literature regarding multi-level models (Rousseau, 1985; Klein, Tosi & Cannella, 1999; Klein & Kozlowski, 2000; Heck & Thomas, 2009) to develop three general models from my putative theory. The mathematical model focuses on the relationships between and within levels. It does not consider causality, how community yields learning. The causal model is variable-oriented like the mathematical model, but deals only with how the community input functions are necessary and sufficient precursors to gains in capabilities. The logic model is process-oriented and incorporates the factors of learning. It is useful for describing and planning learning processes, but not for specifying relationships or testing theoretical propositions.

Illustrating the Proposed Theory with a Thought Experiment

I will now illustrate how a multilevel theory of learning might be applied and tested by presenting a thought experiment. This thought experiment asks what would happen if a region were to suddenly get broadband. I consider two different scenarios, one in which there is no community learning, and a second in which there is a community learning process. The first scenario is equivalent to an experimental control and the second is essentially the treatment group. It should be emphasized that both scenarios are totally fictitious illustrations of the concepts, explanations, and predictions of this study. Both scenarios feature rather unlikely occurrences: A regional foundation investing in broadband and a major telecommunications company taking on that investment, as occurs in scenario one, is rather unlikely in reality. Similarly, it is rather unlikely that several universities would collaborate to help a region get and use broadband, as occurs in scenario two. I ask the reader to suspend any doubts about such
occurrences and consider what might result in these scenarios, without and with community-learning.

The unit of analysis for this thought experiment is the individual human being, and the levels of analysis are personal, organizational, and regional. Analysis involves observing behavior to describe vision and measure connections, and comparing them to find relationships between behaviors and other factors. The independent variables are the input functions of community: identification, integration, and differentiation. These functions can be described and measured in terms of what those at each level do, have, and say. The dependent variables are the output functions of capabilities: liberty, prosperity, and wellness. These real freedoms are observed as particular patterns of connections and visions, measured and described via behaviors. Liberty involves easy connections and vision unimpeded by fear. Benefit from one’s labor is the essential vision of prosperity, and is evident in bountiful connections. Physical disease can profoundly limit visions and connections, so wellness means active, dynamic connections and inclusive, positive visions.

The proposed theory suggests that the real freedoms will be strongest in situations where the community input functions operate across layers of socioeconomic aggregation, that individual, organizational, and regional learning are strongest when aligned via identification, integration, and differentiation. Based on this theory the effect of broadband depends on the extent to which individuals identify, integrate, and differentiate around and through it, as persons, organizations, and regions. If community is weak, my theory predicts, the benefits of broadband will be low and the costs will be high. If community is strong, according to this theory, the benefits will be high and the costs will be low. Real freedoms will increase in
conjunction with broadband use if and only if the technology is deployed in conjunction with community building.

Introducing Greenfield, Georgia

Greenfield, Georgia, is a fictitious city of 100,000, in a region with 250,000 people in just over 90,000 households. Greenfield is the regional hub, sitting halfway between two major metropolitan areas, near the border with two adjoining states, at the confluence of two rivers, between low mountains and hilly lowlands. Greenfield has a diverse economy, with abundant public and non-profit agencies as well as retail and service sectors. The economy is based largely on a cluster of tractor companies and related industries. Indeed, Greenfield promotes itself as the “tractor capital of the world.” The region boasts numerous specialty manufacturers and a very capable, inexpensive, but also under-educated workforce (many of the best workers in the tractor industry have not completed high school).

At the dawn of the 21st century, Greenfield had only dial-up internet access. A scion of the tractor industry, whose family had become very wealthy and established a foundation for regional development, was deeply troubled by this. “How can we attract new business and create jobs,” she asked regional leaders, “without broadband.” “What’s broadband?” they replied. So, this young person decided to do something. With the support of her father and uncles (the tractor industry was highly patriarchal), she used the family foundation to get Major Telecom (MT), a multinational telecommunications provider headquartered in Dallas, Texas, to bring broadband to the region. Basically, the foundation paid to build network infrastructure, which Major Telecom would operate and use to sell broadband internet access.
The partnership, Greenfield Broadband, or GB launched in 2003, and by 2005 was providing high-speed internet access via optical fiber and wi-fi (wireless data network) to every home and business in the region. Even more amazing, subscribers—commercial and residential—could get the first three months’ broadband for free! The Greenfield regional broadband project was widely hailed as a real “game-changer” that would fuel regional economic development.

So, what might happen in and around Greenfield, what might the socioeconomic impact of broadband be? Before I address that question, I look at Greenfield through the lens of my conceptual framework. I review the academic perspectives related to this question. Then I address the question about broadband impacts, and discuss how my proposed theory explains the results.

**Operationalizing the Variables, Testing the Hypothesis**

I present behaviors-connections-visions (B-C-V) as means to describe and measure sociocognitive phenomena. The general hypothesis is that the stronger communities are, the greater the gain in capabilities. This means that certain B-C-V—identification, integration, and differentiation, in combination—result in an expansion of B-C-V, and the more extensive or stronger the community input functions, the great the expansion will be. For Greenfield, this means that the benefits of broadband depend on the extent to which individuals identify, integrate, and differentiate around the technology. The dependent variables are capabilities related to liberty, prosperity, and wellness. The civic, economic, and health effects from using broadband—negative or positive—are the putative outcomes in Greenfield. These outcomes are
evident in behavior-connections-visions about association, expression, earnings, work, disease, exercise, etc.

The independent variables are the community input functions, which, for GB (Greenfield Broadband), are the extent to which individuals engage with each other regarding and via information and communication technologies (ICTs), specifically broadband. When, where, and with whom to Greenfielders exchange information and materials (including money)? What do they see as desirable and why? Does the internet afford more beneficial decisions about whether and which? Does GB lead to an increase in capabilities? Change in behaviors-connections-visions that would indicate strong community input functions include interaction with diverse others around ICTs. Cognitive constructors interacting in loops of learning connected via a triple helix. Hypothetically, this leads participants to identify better uses and reduce costs; they climb the learning curve farther and faster. The construction, looping, and helices can be described, measured, and analyzed to understand how community affects learning about ICTs.

Behavior-connection-vision in this case is how Greenfielders spend their money and time; what they do, have, and say. Doing involves activities, which can be recorded via diaries, measured by an observer (including a digital one), or recalled from memory during an interview or survey. Having has to do with things—assets. The rationale is that better or more things increases real freedoms and satisfies innate drives. Regardless, what one has can be measured monetarily, in terms of market value, or described in terms of reducing uncertainty, the informational content. One’s perspective, including attitudes and beliefs, can be captured via interviews and survey, and inferred from observations.

The elements of vision can be analyzed by categorization and quantization around the sides of vision, particularly what is considered beneficial verses desirable verses possible verses
practical. Then changes in vision can be evaluated by comparing B-C-V (behaviors-connections-visions). At a given point in time actions and expressions can be compared for an individual or a group to evaluate veracity. B-C-V can be analyzed across time identify changes. Those changes can then be evaluated in terms of relations to other factors, to establish validity. For example, meeting a person who knows how ICTs (information and communication technology) can really benefit one can be analyzed in terms of spending on ICTs, talking about ICTs, and using them before and after that meeting, and in terms of the actual benefits derived—for personal, organizational, and regional purposes—from using ICTs.

What determines whether the two people interact and whether one changes behavior (along with connection and vision) as a result of that interaction? The B-C-V framework makes it practical to answer such questions. The W7TH framework—my typology of knowledge elements, or knoels, as how, that, what, when, where, who, why, which, and whether (W7TH)—is useful here, too. Throughout the discussion above and below, the situation with Greenfield is discussed in terms of how, that, what, when, where, whether, which, who, and why. All of this is amenable to description, measurement, and relating. Indeed, W7TH (how, that, what, when, where, who, why, which, and whether) is the means for describing and measuring B-C-V (behaviors-connections-visions).

Behaviors, Connections, and Visions of the Greenfield Region

The starting point for analyzing the Greenfield region with my conceptual framework is behavior, or what individuals in the region do. Much like the nation, about three quarters of the region’s population is of working age, and just over half of the working age adults are employed. Fifteen percent of those work in manufacturing and other private goods producing industries,
20% in government services, and 85% work in service industries. Almost a quarter of the employed persons work in retail, food service, and clerical positions, and earn a median wage of $22,000, less than half the nation’s median earnings. The highest paying managerial and technical professionals make up less than 10% of employed workforce. A quarter of the region’s citizens are retired, 14% are in college, and unemployment is right around 5%.

The Greenfield region has relatively more agriculture, educational services, manufacturing, retail, transportation, and utilities than the rest of the country. Unfortunately, these are not the highest paying sectors, which are under-represented in the region. Greenfield was notably weak in arts and entertainment; information; management; mining; professional, scientific, and technical services; and other higher-paying enterprises. Locally, the most firms and employees are in accommodations and food services; construction; healthcare; manufacturing; and professional, scientific, and technical services. A trend behind the numbers is a large-scale economic shift from goods to services. The number of information and knowledge firms and workers are increasing even faster than most other services. Greenfield is being impacted by the trends discussed in chapter one: technology is replacing labor in the global marketplace making innovation and knowledge increasingly critical. Inclusiveness and openness are necessary for making this happen humanely.

Needless to say, this is a very brief and even simplistic description of individuals’ behaviors in the Greenfield region. Occupation is the yardstick by which most policymakers and politicians (particularly those concerned with the economic impact of broadband) describe and measure our world. Clearly, occupation tells us little about how people actually behave, particularly outside their organizational roles. That said, it is possible to make some rudimentary presumptions about connections and visions even from such a superficial description. For
example, half of the regions’ residents rely on non-work connections—parents, spouses, children, etc.—for their livings. And, at least a quarter of the working population does not see how they can earn a decent wage.

There is a range of other high-level observations we could make about what individuals have and say—their connections and visions—in the Greenfield region, based on the summary above. But, rather than delving into these specifics, let us consider generally how to operationalize the components of my conceptual framework. The starting point is behavior, connections, and visions, or what individuals do, have, and say. As implied by the discussion above, behaviors in this framework are activities, events, habits, etc. These can be assigned to non-exclusive categories or spaces: personal space, organizational space, and regional space. Personal space can be defined as the home, but conceptually personal space is anything that primarily impacts the person with minimal influence by organizational or regional concerns. For connections, this means family and friends, personal belongings, personal media use. For visions, this means attitudes and beliefs about such things. All of this is evidenced by behavior: who an individual communicates and spends time with, what he or she has control over or possession of, and what are her or his sources of entertainment, news, etc. Where one behaves is also informative.

The W7TH (how, that, what, when, where, who, why, which, and whether) framework is useful here to describe subjective visions and measure objective connections, particularly in specific context (e.g., Greenfield gets broadband). W7TH provides a means to describe and measure where individuals spend their time and money, the appliances, devices, tools, and vehicles they use, and how these things are used. It is also a way to assess attitudes toward and beliefs about these activities, items, and others. Specifically, in Greenfield, this framework can
be used to document what people see as beneficial/possible with and desirable/practical about broadband—what drives and what limits their broadband use. Current attitudes and beliefs about these things now and in future can be compared with past attitudes and beliefs. And, both are true for comparison and contrasting across organizations, based on individuals’ personal orientation, organizational affiliations, and regions. The same is true for available information and materials: current versus past amounts and types by personal, organizational, and regional characteristics.

When applied to the proposition that community causes an increase in capabilities, the framework should allow valid measurement and verifiable description of the dependent and independent variables. With the combination of B-C-V (behaviors-connections-visions) and W7TH researchers, policymakers, and practitioners can assess the impacts of broad in the Greenfield region across persons and organizations, and can compare them to other regions. More importantly for the theory presented in this dissertation, the B-C-V/W7TH framework makes it possible to examine the assertion that the community input functions occur before, and are positively correlated with, the impacts. And, that this effect is stronger when those functions occur across personal, organizational, and regional spaces.

Broadband

Much of the investment in broadband around the turn of the 21st century, particularly public investment, was based on the *Field of Dreams* (Robinson, Gordon, & Gordon, 1989) metaphor, “If you build it, they will come.” This metaphor has two presumptions built into it (for examples of the presumptions see Eaton (2012), Helms (2012), and Worstall (2012)). First, if broadband service becomes available people will take it up and use it. This is about adoption.
Second, broadband will attract companies to relocate to, start up in, and hire employees where it is available, which is about impact. Both presumptions involve use. Individuals will change behavior by using the broadband, or at least to use it. Organizations that use broadband will favor those with it, or at least shun places without broadband.

**Broadband Adoption**

In some ways, broadband is a prime example of the adoption of new technologies (i.e., innovations) as described by Rogers (2003)—generally known as “diffusion of innovations theory,” or just “diffusion theory.” According to this theory, there are five steps—knowledge, persuasion, decision, implementation, and confirmation—in a linear adoption process. Diffusion occurs at varied speed: slowly at first with a few early adopters then it increases rapidly as the majority adopts the new technology relatively quickly until diffusion tapers off with a few laggards holding out and the innovation becomes generally accepted. Represented graphically, diffusion takes the form of a learning curve (Yelle, 1979; Adler & Clark, 1991).

The rate of adoption/diffusion—the slope of the learning curve—according to Rogers (2003) depends on characteristics of the innovation, the number and type of communication channels, the structure of the social system. Adoption can be contingent on authorities or collective decisions. Communications with different agents promote knowledge of innovations, according to diffusion theory. Opinion leaders effect persuasion and decision via evaluation. Of course, the process doesn’t happen with every innovation, and different types of innovation diffuse differently. General-purpose technologies diffuse differently from special purpose technologies. Technologies that become more beneficial as more adopt them—exhibit network
effects—diffuse differently than those that don’t. Fax machines and e-mail, for example, diffused differently than automobiles, the plow, and radio.

Information and communication technology (ICT) researchers have evolved diffusion theory into the technology acceptance model (TAM), which sees perceived usefulness and perceived ease-of-use as the primary factors in adoption of ICTs. Perceived ease-of-use determines whether a person will try an ICT, and perceived usefulness determines whether he or she will continue using it. Major contributions to TAM come from Davis (1989) and from Davis, Bagozzi, and Warshaw (1989). Attewell (1992), King and Teo (1994), Taylor and Todd (1995), and Thong and Yap (1995) emphasize the role of leaders’ experience with and knowledge of ICTs in organizational adoption. Chuttur (2009) provides an overview of this literature.

In this literature, adoption is an individualistic and rational process. The literature, not coincidentally, downplays the role of social norms and generally does not consider organizational or social arrangements. Other approaches to learning, particularly Bandura’s social learning theory (1977, 1988, 1997, 2006), conceive of learning as an intrinsically social process. Others see knowledge as socially constructed (Berger and Luckman, 1966) and learning as situated in particular culture, context, and activities (Brown, Collins, and Duguid, 1989).

The technology acceptance model (TAM) has been extended with social influence and cognitive processes (Venkatesh and Davis, 2000), focusing on intention to use ICTs (information and communication technology) as the best indicator of actual use. Hybrids of TAM with socio-cognitive theory and other approaches are used to investigate ICTs for higher education (Yi & Hwang, 2003), online tax (Wu & Chen, 2005), healthcare (Yi, et al., 2006), virtual communities (Chiu, Hsu & Wang, 2006), mobile banking (Ratten & Ratten, 2007), and knowledge management (Lin & Huang, 2008). Results are mixed.
Venkatesh, et al., (2003) draw from eight theoretical perspectives to suggest that performance expectancy, effort expectancy, social influence, and facilitating conditions are the determinants of adoption. TAM is the best overall explanation of ICT adoption and use (Hong, Thong & Tam, 2006), but SCT (social cognitive theory) explains intentions to use ICTs (Ratten & Ratten, 2007), and task-technology fit is important for explaining ICT adoption and use in situations with strong task interdependence (Lin & Huang, 2008). LaRose, et al. (2007), studied intention to use broadband among rural residents through the lens of sociocognitive theory, and found that:

Prior experience with the Internet, the expected outcomes of broadband usage, direct personal experience with broadband, and self-efficacy had direct effects on broadband intentions. Age and income, but not education or ethnicity, also had direct impacts. (p. 359)

Beyond their conclusions about broadband adoption, LaRose, et al., find that:

Social-cognitive theory and the conventional diffusion of innovations paradigm provide complementary views of the adoption process. The present research equated the diffusion concept of relative advantage with the socio-cognitive concept of expected outcomes, trialability with enactive learning, observability with observational learning, complexity with self-efficacy, and compatibility with prior experience with related technologies. This presented a fresh approach to conceptualizing innovation attributes that stressed the role of the adopter/user rather than the properties of the innovation. (p. 368)

Beyond the theoretical explanations, actual internet adoption and use have been tracked by the Federal Communications Commission (Horrigan, 2010) and Pew Internet and American Life Project (Pew Internet, 2012). They find that 81% of Americans use the internet, and show an adoption trend that takes a learning-curve form. Two-thirds of Americans have broadband at home. Internet users tend to be younger, white, higher income, and more educated. The internet is used for a wide range of general and special purposes and tasks according to Pew Internet.
Horrigan (2010) notes that the social aspects of the internet are more important than entertainment. The more knowledgeable users are, the more they get from broadband, according to Horrigan (2010), and cost is major barrier to adoption. Dwivedi and Lal (2007) found the difference between adopters and non-adopters to be attributable to socioeconomic factors—age, education, income, occupation, etc.—except for gender.

So we know how many people have adopted the internet, the characteristics of those people, and generally what they do with it. We know the when, where, and who of internet use. What we’re less clear of is why, particularly in relation to innate drives to acquire, bond, and defend. The literature on adoption of broadband and other ICTs (information and communication technology) implies various impacts. Hypothetically, the practical value of the internet comes from it being actually useful. The individuals, organizations, and regions that acquire broadband do so with expectation of benefits of use to outweigh the costs. Are there benefits? What determines the value of ICTs? What are their impacts?

Diffusion theory provides understanding of how awareness and use of innovations spread. TAM (technology acceptance model) highlights the importance of expectations and intentions, especially fit between tasks and the technology. The extensions of TAM—particularly sociocognitive theory—suggest that social and other-oriented factors are important in ICT (information and communication technology) adoption, but results are inconsistent. The questions become what makes broadband use important, how it increases individual capabilities, and what the nature of the social factors are; are they community?

Through my conceptual lens, the adoption issue is one of change in B-C-V (behaviors-connections-visions). A person (or organization or region) does not use digital technology; then he or she does. He or she uses it a little, then uses it a lot, or doesn’t, and stops using it. Certain
types of connections precede and follow change in behavior, as do general beliefs—a new source of information is credible, ICT could be beneficial, costs and risks are low, etc. Theoretically, the concept of community input functions builds on factors in the range of literature on the topic. So, social networks, models, and self-efficacy are important factors, but these functions explain how those factors—specifically, regarding broadband and other ICTs—are translated into real freedoms.

Broadband Impacts

The impacts of ICTs, and broadband specifically, are construed in several ways—as gross economic product, in terms of social integration, and on productivity. Fischer (1992) says the telephone as one of the harbingers of modernity was accompanied by concerns about:

The growth of cities, wider communication, more material goods, mass media, and the specialization of land use and institutions … fostered individualism and interpersonal alienation, abraded the bonds of social groups, and bred skepticism in place of faith. (p. 4)

The technology is seen as both alienating and liberating, Fischer notes, which are common themes in social history of technology. Indeed, we see the alienating and liberating themes in discussion of impacts of broadband and other ICTs (information and communication technology). Fischer (1992) concludes that:

[W]hile a material change as fundamental as the telephone alters the conditions of daily life, it does not determine the basic character of that life. Instead, people turn new devices to various purposes, even ones that the producers could hardly have foreseen or desired. As much as people adapt their lives to the changed circumstances created by the new technology, they also adapt that technology to their lives. The telephone did not radically alter American ways of life; rather, Americans used it to more vigorously pursue their characteristic ways of life. (p. 5)
Fischer emphasizes the importance of considering both first- and second-order consequences of technology: the effect for or on the user, and what widespread use means for others. For ICTs in general, and broadband in particular, scholars see these effects in terms of two paradoxes.

*The Productivity Paradox*

Solow (1987) pointed out the first paradox, “You can see the computer age everywhere but in the productivity statistics” (p. 36). The rationale for investing in ICTs is that they make organizations more productive, profitable, and successful. Research supports this rationale (Mahmood and Mann, 1993; Melville, et al., 2007), particularly for specific industries and with specific technologies (Mukhopadhyay, et al., 1997; McAfee, 2002; Bartel, et al., 2007). These effects were not evident to Solow—an eminent economist—in 1987 because ICTs require learning, and learning takes time. Consequently, the benefits from ICTs tend to lag behind the costs.

Productivity tends to decrease immediately after deployment before rising above pre-ICT (information and communication technology) levels (Attewell, 1992; Nilsson, 1995; Greenwood, 1999; Lee and Barua, 1999; McAfee, 2002). This gives the cost/benefit curve for ICTs look much like the diffusion learning curve, discussed above. The steeper the curve, the stronger the return on ICT investment is, and the greater the gain in organizational performance.

What factors determine whether ICTs increase performance and improve outcomes? Organizations that utilize ICTs tend to have integrated products and services, complex and informal structures, melding of technical and manual jobs, and participative management (Burris, 1998; Wozny & Regli, 1996; Vizard & Neel, 2000; Black & Lynch, 2001). Organizations that invest in ICTs tend to be smaller and less vertically integrated, and have closer working
relationships with a relatively smaller set of suppliers (Reddi, et al., 1993; Brynjolfsson, et al. 1994). Organizations in diverse, dynamic industries realize greater benefits from ICTs than those in highly concentrated, static industries (Melville, et al., 2007), as do organizations from advanced economies as opposed to those in developing countries (Tam, 1998). Clearly, there are contextual—including cultural—issues that impact utilization of ICTs, and that are impacted by it. Organizations must have a form and structure, and be in an environment, that enables them to capitalize on ICTs.

The organizations that are most successful with ICTs digitize their processes as well as their products (McAfee and Brynjolfsson, 2008). These organizations focus on non-routine information, delegating routine information tasks to their information systems (Martin, 1999), and they experiment with various types of ICTs (Haltiwanger, et al., 2003). They have small production runs and make frequent changes in production (Kelley, 1986, 1994), and have more customized products. ICT utilization is correlated with higher skill requirements, particularly for problem-solving and technical skills, and for executives and managers as well as workers (Swanson 1994; King and Teo, 1994; Thong and Yap, 1995; Mata, et al., 1995; Burris, 1998; Bartel, et al., 2007). The implication, which is not explicit in the literature, is that firms that benefit from ICTs are not low-quality commodity producers who compete solely on cost. Firms that benefit from ICTs are flexible yet specialized, with highly collaborative and knowledgeable employees that compete on the basis of relationships, quality, and uniqueness.

The broad conclusions are that ICTs do drive economic growth, particularly increases in labor productivity (Oliner and Sichel, 2000), but “the business value of computers is limited less by computational capability and more by the ability of managers to invent new processes, procedures and organizational structures that leverage this capability” (Brynjolfsson and Hitt,
The quality of information, service, and system determine the net benefits of ICTs via use and user satisfaction (DeLone and McLean, 2003), but the use has to be appropriate to the competitive environment (Soh and Markus, 1995). Return on ICT investment is increased by assuring that executives, technologists, and users share reasonable assumptions and expectations for the technology, and by having focused goals for ICT investment that aligns with the organization’s strategic goals (Orlikowski and Gash, 1994; Tallon, et al., 2001).

The later research discussed here (McAfee, 2002; Bartel, et al., 2007; Melville, et al., 2007; McAfee and Brynjolfsson, 2008) suggests that the competitive environment itself is experiencing fundamental changes enabled by ICTs. Popular business press books reiterate and expand this thesis. One of the earliest such books, *Re-inventing the Corporation* (Naisbitt and Aburdene, 1985), argued that the very nature of organizations and work was going to change from the bottom up, driven by ICTs. The predicted changes weren’t about ICTs—many, such as fostering employees’ personal growth and paramount importance of quality, seem to have little to do with ICTs. It is a broader shift in the environment, enabled by ICTs, that is driving these changes. Naisbitt and Aburdene’s predictions are borne out in ways that even they could likely not have imagined, as documented in books such as *A Whole New Mind* (Pink, 2005), *The Spider and the Starfish* (Brafman and Beckstrom, 2006), *Wikinomics* (Tapscott and Williams, 2006), *Here Comes Everybody* (Shirky, 2008), and *Tribes* (Godin, 2008). By decentralized and open organizations that tap their customers’—as well as employees’—capabilities, organizations are able to solve intractable problems, radically reduce costs, and create innovations and new knowledge. These improvements enable the organizations to overturn markets and traditional market leaders. All of this is because ICTs reduce the need for formal organizational structure.
In sum, the literature reviewed above makes some bold propositions about the impacts of ICTs. The literature suggests that ICTs are not just tools for increasing productivity, or even for changing what is produced—although use of ICTs is having these effects. ICTs are changing the way production is carried out and even very concept of what it means to produce, according to this literature. ICTs are being integrated into organizations as transparent infrastructure (Star, 1999) even as they transform the organization. The literature suggests that to fully benefit from ICTs, organizations must fundamentally change the way they do business by eliminating hierarchy, opening up to customers, developing intangibles assets, and, most of all, focusing like a laser beam on customer-defined quality. ICTs do not invariably lead to these changes; they enable such changes when coupled with willingness to learn and disciplined, visionary leadership.

The Internet Paradox

The internet paradox, as discussed by Kraut, et al. (1998, 2002), occurs when use of internet technology, which is presumably social, causes depression and loneliness. The internet was predicted to engage and mobilize citizens (and consumers), but in more fragmented manner independent of existing institutions (Bimber, 1998; Calhoun, 1998). Galston (2000) worried over autonomy versus connection, and whether online communities had limited membership, shared norms, affective ties, and a sense of mutual obligation. Exit is too easy online to drive development of mutual obligation or personal voice, and there will be scant acknowledgement of authority.

Early results showed that the combination of face-to-face and online communication builds stronger community than either approach alone (Etzioni & Etzioni, 1999; Hampton &
Community-related internet content emerged from non-profit, governmental, and commercial sources, but the technology did not build social capital or increase civic participation (Tonn, Zambrano & Moore, 2001). The internet makes it easy extend and maintain social connections (Howard, Rainie & Jones, 2001), especially to reach those “just out of reach” (Hampton & Wellman, 2001). Internet use does not decrease or increase attachment to place or civic involvement, but does increase communication and social interaction (Katz, Rice, & Aspden, 2001; Kavanaugh & Patterson, 2001; Stern, 2006).

These things hold especially for the tech-savvy, who tend to be more involved (Howard, Rainie & Jones, 2001; Kavanaugh & Patterson, 2001; Stern, 2006). People with greater participation and more connections are more likely to use internet because they are better off, more educated, and younger (Nie, 2001; Stern, 2006). Those who are online the least and the most tend to be less involved and committed than those who balance online and face-to-face (Wellman, Haase, Witte & Hampton, 2001).

“Explaining Internet behaviors entails understanding that the Internet is not a separate entity but instead a (potential) complement to ongoing activity” (Haythornthwaite, 2001, p. 379). In re-examination of the Internet paradox, any depressive effects seemed associated with initial frustrations and faded (Kraut, et al., 2002). LaRose, Eastin, and Gregg (2001) found that internet use could only be connected to depression via self-efficacy, but social support via e-mail reduced depression.

The internet paradox does not address why people would, or would not, adopt internet, but the literature implies that the general purpose is to access information and communicate. It seems that sociability can suffer as one learns ICTs (information and communication technology), but also those who are pre-disposed to sociability use ICTs more than others. The
internet paradox literature doesn’t delve into economic issues but it is reasonable to presume this effect would hold for productive activities and work. Could it be that individual ICT impacts can be explained by factors similar to those of organizations? Based on the internet paradox literature, could it be said that flexible yet specialized persons with ability to invent, reasonable expectations, focused goals, and less need for formal structure would make the most of broadband.

The internet has real potential to enhance productivity, conclude Litan and Rivlin (2001), but the greatest impacts may be in “old economy” industries due to changes in information flows. The internet creates many opportunities for efficiencies in various areas of business performance, adding 0.2 to 0.4 percent to the economy’s total output according the Litan and Rivlin. This estimate does not include the value of improved choice and convenience, which may be even more valuable than productivity gains and lower costs.

Crandall, Jackson, and Singer (2003) estimate the consumer surplus, investment in broadband infrastructure, and broadband equipment production, but focus on employment and output for telecommunications providers. Crandall, Lehr, and Litan (2007) find that broadband contributes to employment in education, healthcare, financial services, and manufacturing.

Pilat and Wolfli (2003) examine the impacts of ICT production and ICT (information and communication technology) use, as well as ICT diffusion. They delve into explanations for variation in national investment, factors that firms benefit from ICTs, and how ICTs impact performance. They find that ICT cost differentials, need for complementary investments, and regulations impede adoption. ICTs contribute to capital deepening as the replace labor, increase firm efficiency, and contribute to network effects. The ICT-producing sectors are strongly impacted by these contributions, and are well-positioned to overcome the impediments. Pilat and
Wolfl found relatively high productivity growth among ICT-using industries, particularly business services, finance and insurance, transportation, wholesale trades, and retail.

Lehr, et al. (2005) begin their assessment by noting that broadband affords information productivity and innovation, complex, non-routine problem-solving, and more intensive use than dial-up. They also noted that literature on ICTs and productivity focuses on organizations while broadband policy has focused on residential. Flexible work arrangements, home-based businesses, higher quality labor force, and higher quality of life could contribute to the impacts of broadband at home. Their findings confirm the link between internet and economic development, but “[t]he positive impact on establishment growth was higher for larger establishments and for IT intensive sectors of the economy” (Lehr, et al., 2005, p. 22).

Broadband boosts employment, productivity, property values and rents, but not wages. Places with broadband had more businesses per capita but relatively fewer small businesses. They leave open the question of whether these are short-term, transitory effects, or whether they can be sustained. They conclude that, “differences in economic outcomes are likely to depend more on how broadband is used than on its basic availability” (Lehr, et al., 2005, p. 24).

In a cross-country analysis, Quang, Rossotto, and Kimura (2009) found that broadband impacts knowledge, productivity, and community competitiveness via various sectors. The technical qualities of broadband, including complementary products, are important to impacts. Quang, Rossotto, and Kimura maintain that the literature misses the importance of critical mass, confuses activities and applications with benefits, and has issues with bias and causality. Human capital as an “impact” of broadband—skill learning-by-doing, dynamic knowledge sharing, and attracting talent—transcends traditional institutions enabling collective innovation. Quang, Rossotto, and Kimura found impacts via efficiency and productivity and community
competitiveness, but emphasized that broadband is “general purpose technology that can fundamentally restructure the economy” (p. 39). They conclude by emphasizing the need for complementary investments:

[Broadband’s] benefits are major and robust for both developed and developing countries, although the significance is higher for the former, which have a longer track record of broadband diffusion. … Realizing the benefits of broadband also requires development of new content, services, and applications, as well as increased human capacity to adopt the technology in economic activities. (p. 45)

Katz (2009, 2010) also finds that broadband has positive economic impact, which increases with penetration. ICT investment is associated with broadband penetration, and with productivity and growth. Broadband is fostering an economic transition, Katz (2009) maintains, that is strengthening this relationship. “Economic impact varies by region indicating that broadband deployment needs to be carefully coordinated with economic development policies (training, firm relocation, etc.) to maximize impact” (Katz, 2010, p. 13).

Applying my B-C-V (behaviors-connections-visions)/W7TH (how, that, what, when, where, who, why, whether, which) framework to the issue of ICT (information and communication technology) impacts begins with what it is that’s being impacted: Real freedoms. Human capabilities, as the ultimate ends—improvements in individuals’ liberty, prosperity, and wellness, provide a philosophically and practically sound basis for evaluating ICT impacts. The framework allows for multilevel analysis because it applies at all levels—individual/personal, organizational, and regional. The fundamentally different natures of the levels—cognitive constructor versus loops of learning versus triple helix—can be translated into real freedoms: personal fulfillment, organizational performance, and regional advantage. The B-C-V/W7TH framework also allows adoption and related factors to be related to impacts. With the framework,
it is more practical to relate changes in B-C-V related to (use of) ICTs to more general changes in B-C-V that indicate real freedoms. More fundamentally, this dissertation suggests that the difference in adoption and impacts of ICTs for individuals, organizations, and regions can be explained by the extent to which community input functions were applied to their situations.

Broadband in Greenfield

The most important thing to consider in regards to broadband in Greenfield is the individual, her or his interests, and how he or she is able to pursue them. Individuals putatively use broadband for personal, organizational, and regional purposes, and they think and act on broadband for those purposes. How does broadband impact individuals’ capabilities? What determines individuals’ adoption of—or just investment in—broadband? How does broadband relate to fundamental drives? The following describes what might occur, inferred from the empirical literature reviewed above.

In Greenfield, the scion sees broadband as critical infrastructure and is connected to a foundation that can be focused on broadband. The visions of the scion and the foundation board members converge on broadband as a business attractor. And, it could be good for existing organizations, for improvements in business, education, healthcare, safety, etc. The board members and many of their peers have no real experience with internet technologies, though, so they can’t envision applications. They think in terms of computer-, mainframe-, or even paper-based processes. How internet applications enable social interaction is not even a consideration. And, they do not see economic transformation necessarily as a good thing. They see broadband as an infrastructure game-changer. The game is industrial attraction.
For Major Telecom (MT), Greenfield Broadband (GB) is an odd thing. It’s not a game-changer, but it’s definitely not a standard operation. The Greenfield Regional Foundation (GRF) put up the capital for the infrastructure (along with state and federal grants), and they cover the maintenance costs, too. Major Telecom pays the marketing and customer service costs, including provisioning service and tracking accounts. GB contracts much of the construction and maintenance to MT. The hybrid fiber and wi-fi network is not something that they—MT’s directors—are used to; they’ll bring in contractors to do the work. GB doesn’t compete with any of their existing offerings, and they feel they can convert GB customers to their customers when the time comes. They see it as project, and as a learning opportunity.

So, who signs up for GB, what do they do with it, and why? In the first three months of GB’s operations, over 3,000 households and almost 700 organizations sign up. The strongest response by far (given their portion of the population) comes from young, well-educated families. When Greenfielders get broadband, they spend time online. For many of them, particularly those who have little or no exposure to the internet, much of this time is spent exploring—surfing the web—by searching for people and things of interest to them. GB (Greenfield Broadband) is used to supplement other media—particularly newspapers and TV (television), searching for information about artists, authors, recordings, shows, etc.—and telecommunications. Other uses include finding classmates, old friends, and, relatives; investigating hobbies; looking for cars, clothes, music, news, and jobs. Much of this is done alone, although about a quarter of Greenfielders’ time online involves communicating with other people. There is some social surfing, about 20% of time online, in family and social settings, particularly young people helping parents and elders to find particular information or use certain internet features. More experienced users do similar things, but tend to have more distributed and
extensive social networks so spend more time communicating with distant relations. They also tend to do more work online, more than do individuals with less internet experience, and spend more personal time working, due to easy and fast internet access.

This level of adoption and use mirrors the results discussed in the literature. People use Greenfield Broadband (GB) to do what is meaningful to them, activities they enjoy, pursuing valued outcomes and fulfilling their commitments and responsibilities. This includes acquiring resources that are means to valued ends. Some may value GB intrinsically, as something to experiment with or explore, but even these people will use GB only provides some benefits. GB must directly or indirectly ameliorate fundamental human drives and motivations. It may be assumed that people are already responding to their innate drives as best they can. Even if GB or similar information and communication technologies (ICT) could greatly improve their efforts and increase capabilities, people are not going to significantly alter their B-C-V without high levels of certainty (information) about exactly how and how much things will improve. And, they have to be sure the cost or difficulty of using the technology is fully offset by the benefits of using it. The costs are not just for the technology, they are the sociocognitive expense—the attention, time, and relationships—required to benefit from the technology. What we seen in this scenario is that individuals generally don’t clearly see the personal benefits of GB. Indeed, they don’t what the benefits might be, or how to realize them.

What about organizational use? Only a few companies sign up for GB right away. Slightly more non-profits do, but then unsubscribe after a couple months. Most public agencies sign up for GB, but only one location per agency. To better understand the organizations’ behavior one might conduct case studies, or just do interviews. The basic questions are: What information and communication technologies (ICTs) does the organization have? What does the
organization do with ICTs, who uses them, and how to they use and talk about the ICTs? Why do they have ICTs, and how do they make ICT decisions? Generally, what do Greenfield’s organizations know about ICTs?

The organizations that sign up already have substantial technology resources, and mainly sign up to replace more expensive, slower internet access. Greenfield’s organizations, overall, have limited ICT-related capabilities. They have pockets of expertise. The experts are young, relatively well educated (associates or bachelors degrees) lower-level employees who report to older, less-educated managers, often to financial managers who see ICTs as an expense to be minimized. Greenfield region organizations use ICTs primarily for accounting. Some have ICTs for sales and order entry through account aging and collections, anything having to do with money. The larger private companies have more extensive ICT applications for controlling and designing. They use ICTs to create artistic/technical works or physically manufactured goods. ICTs are used heavily for administrative, clerical, marketing, and media purposes; all of which generate digital files. ICTs are also used extensively to control manufacturing machinery, although a relatively small number of organizations are in manufacturing (ten of the 700 organizational GB (Greenfield Broadband) subscribers were manufacturers). Governmental and non-profit organizations, with generally less technology than their private counterparts, used it in much the same way, for accounting.

Organizations with GB see an increase in e-mail and web surfing, but much of it is non-productive and not work-related. Organizations in the Greenfield region only reallocate a few resources to ICTs due to GB. Their technology funding stays constant, and they do not significantly change what technology they are spending money on. The results at the organizational level can be explained as the results at the personal level: There is little
understanding of the potential benefits of GB or how to realize those benefits. So, there is little change in B-C-V at either level as a result of GB.

By the time GB is built, a quarter of the residents of the Greenfield region have e-mail, a third of which is work e-mail. They are generally aware of online commerce and educational resources, and they know of internet searching. But, since Greenfield has had only dial up internet, few people have experienced these things. Over half the households have a computer, three quarters of which are over three years old. Twenty percent of workers use computers. Use varies greatly, but computers are used largely for documents and for e-mails. ICTs (information and communication technology) are used to capture and share information about what people do, have, and say. Few people in the region have thought about exactly what they might do with ICTs, and only a few business people have considered that ICTs might enable them to change how they operate and even what they do.

The use of GB (Greenfield Broadband) in the first three months is almost totally personal. Individuals reallocate personal time to broadband. On average, GB subscribers spent 10 hours per week online during their first three months, totaling over 1.5 million online hours. There is also an increase in personal computer ownership and ICT spending. GB subscribers spent an average of $450 online on hardware and software over the first three months. After the first three months, GB subscribers pay $45 per month for broadband, so in month four over one hundred thousand dollars a month flows out of Greenfield to Major Telecom. And, that’s just the beginning. Subscriptions rates follow the classic diffusion curve (Rogers, 2003) through the first 18 months, leveling out at 60% subscription rate or about fifty-four thousand residential subscribers. At that point, GB is generating $2.4 million a month for Major Telecom.
GB subscribers also shifted much of their other spending online. The average Greenfield household spent $3,000 per month on non-durables. GB households spent $330 online on these goods, and spent more online in hobbies and travel than non-GB households. Over their first three months of GB service, initial subscribers spent nearly $2.5 million on non-durable goods. The same is true for subscribers’ time. Although they were physically in the region, the bulk of their time spent online involved extra-local activities and relations. Baseball, cats, diets, hiking, Hummel figurines, and minerals are just a few of the interest Greenfielders explore online. They also discover online gambling, gaming, and pornography. Subscribers gained competencies from using GB—learning to find, interpret, and share information. Unfortunately, those competencies do not have work value for most subscribers because they don’t use internet in their jobs. Fifty subscribers, half with strong technology backgrounds, reported using GB to find jobs outside the region and plan to leave Greenfield. Greenfielders just kept on doing what was important to them; GB simply eliminated the constraints of place.

Subsequent subscribers exhibited similar behavior. At the end of 18 months, Greenfield citizens were spending over $17 million online per month, or some $216 million over a year and a half. Since very few organizations in the region had an online presence, effectively all of this money was spent outside the Greenfield region. Along with online purchases of computer hardware and software and spending on broadband, at the end of 18 months over $240 million has flowed out of Greenfield due to GB. With an average of 2 users per household spending 10 hours per week online, Greenfielders spent nearly 4.6 million hours per month online, most on non-local topics.

The effect is that individuals with GB spend less time with family and friends as they explore and learn the internet. Individuals don’t connect to local organizations online because
those organizations aren’t online. When individuals buy online, they buy from distant vendors. They pursue their interests by engaging distant others and finding information from distant resources. The result is a major shift in Greenfielders’ activities, assets, and attention away from and out of the region. They discover the possibilities to do and have new things, based on their prior knowledge, that were limited by availability of information and materials in the region. As their connections expand via the internet, so do Greenfielders’ visions.

GB (Greenfield Broadband) resulted in a change in Greenfielders’ behaviors, connections, and visions, derived from their innate drives as persons, organizations, and a region. The simplest way to see this is by looking at how Greenfielders spend their time and money. With GB, they simply pursued pre-existing interests via new means. This took them out of the region, economically and socially if not physically. They found new possibilities based on their interests, possibilities that were more beneficial or desirable, or both, than possible activities and assets near Greenfield. GB users found new, non-local sources of information and material, and then they spent their money and time on/with these sources. Greenfielders found personal fulfillment via GB independent of their organizations and region. That’s about individuals; organizations were different.

GB meant only incremental, at most, changes in organizational connections and visions. The changes in collective behavior did not extend much beyond subscribing to GB, and some, such as personal web surfing on company time, were not good for organizations’ purposes. Organizational vision saw the downside of broadband more clearly than the upside, and GB did not impact their information and materials. GB simply didn’t affect organizations’ capital and labor, their assets and activities. At the regional level, GB was an infrastructure enhancement, but a relatively small one in comparison to transportation, utilities, and other traditional
infrastructure. The B-C-V (behaviors-connections-visions) of regional institutions—as evidenced in businesses, churches, hospitals, schools—does not change, either. General interest in Greenfield as a business location increases due to GB, but no company opens or expands because of it. There is only minor improvement in regional advantage. So, individuals use GB to find fulfillment, and leave behind organizations and the region in the process, which also deprives others in the region of financial, human, and social capital.

Individuals’ vision for GB (Greenfield Broadband) gained on the topside. Prior to GB Greenfielders didn’t know what was possible because internet functions were not practical without high-speed access. GB eliminated a bandwidth constraint, and it eliminated a place constraint on information. Increased availability of information enabled individual behavioral change. Organizations, in contrast, gained no information regarding the topside, about how internet technology might benefit them or about why, when, and under what circumstances the internet is desirable.

The analysis here is the W7TH—how, that, what, when, where, who, why, whether, and which knowledge elements, or knoels—of individuals’ personal, organizational, and regional B-C-V. GB subscribers saw major personal B-C-V change; as organizations, they did not. Organizations, with particular purposes, could not see the benefit—particularly vis-à-vis the costs—while persons’ diverse interests were better served by the technology. Early adopters faced low personal costs relative to organizations in both direct technology costs and soft costs of using GB. What appeared as a limiter to organizations—personal use of the internet—was a driver for individuals. Organizations’ structure—capital assets, division of labor, processes, etc.—did not change as a result of GB. At the regional level GB entailed an objective physical change in infrastructure assets but no concomitant change in institutions. GB did not impact the
region’s rules, roles, or resources; at least, not in a directly observable manner. Regional leaders sought to attract business investment and create jobs, but GB ended up enabling reallocation of personal money and time to things outside the region. Essentially, GB functioned as a sump pump, pulling personal financial and social capital out of Greenfield.

The dependent variable that I posit is capabilities as evident in liberty, prosperity, and wellness. In the absence of community-learning, how did GB impact Greenfielder’s capabilities? It was most useful for the relatively young, affluent, and well educated residents of Greenfield. GB increased ability to associate with others, access to information, and opportunity for self-expression. There was some concern about privacy and government surveillance, but not enough to stop people who want to be online. Those who wanted to be online saw some boost in prosperity, too, either from purchasing something at lower cost, reducing commuting and other work expenses, or finding a better job. GB users gained some competencies with internet technologies and communications, which were useful in finding a job in a few cases. Wellness was a wash because some people did find useful diet, exercise, or other health information but GB users also increased sedentary activities. Most of this happened at the personal level.

Clearly, this scenario is not what was intended by “if you build it, they will come.” Of course, this is not an account of actual events; it is a consideration of what might happen if a region were to suddenly get broadband. The point of this illustration is that it’s not what you have (or say) that matters; it’s what you do. And, community is the means by which we discover what to do, as a person, an organization member, and a region resident. The “build it and they will come” metaphor that guided Greenfield Broadband (GB) does not consider this. Consequently, there were few and weak community-input functions within the region, linking individuals to each other and to regional organizations. There was limited learning, few real
gains in capabilities or improvements in real freedoms, and those were realized by going outside
the region. Those who instigated GB so fully internalized the “build it and they will come”
metaphor into their vision that they were not fully conscious of it. They had no cause (model or
stimulus) to question the metaphoric assumption or its implications.

Essentially, what occurred at the personal and organizational level also occurred at the
regional level: institutions used GB to keep doing what they were already doing rather than as a
way to do new things, let alone to accomplish new ends. This is what existing theory would
predict, and an extension of what has been found in empirical literature. But, because of the gaps
between single-level theories of learning, and because of academic and practical difficulties of
studying multilevel phenomena, there are scant means to predict what might happen if learning
were to be aligned across and between levels. I maintain that the phenomenon that enables the
structural changes necessary for substantive learning is community, or the emergence of
community via iterated sequences of identification, integration, and differentiation.

In scenario two, below, I consider what might occur if those involved intentionally build
community and facilitate substantive learning across levels. As with scenario one, the second
scenario is an illustration of my propositions that is purely fictional and involves some unlikely
occurrences. Where the first scenario acts as the “control group” for my thought experiment—in
which there is an absence of community-learning—the second scenario is an illustration what
might occur with community-learning. In the first scenario, the roles and actions of the tractor
industry scion, Greenfield Regional Foundations, and Major Telecom as instigators require some
suspension of disbelief. But, once one accepts how the scenario was instigated, the results are
quite reasonable, albeit totally fictional. Similar is true of scenario two: The premise might be

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dubious, but the results, given the premise, have verisimilitude. First, though, let us consider how scholars might research GB in this first scenario.

Researching Scenario One

Above, I discuss scenario one, in which Greenfield gets broadband with no community-building, omnisciently. If this were a real research project, the information I provide would have to be gathered and analyzed by researchers. So, let’s say this is the case: In scenario one, a team of university researchers studies the impacts of GB (Greenfield Broadband). How would they do this? First, they would have to define what they are researching, their variables. Clearly, one set of variables relate to GB. Let’s say the researchers are interested in signing up for and using GB. Going from the literature, we can see this as a dependent variable—what factors determine whether one subscribes to GB and/or how much one uses it—or as an independent variable—what are the effects of subscribing to and/or using GB.

Whether researchers are interested in effects or factors, it will be necessary for them to specify whether the effects/factors of interest are economic, organizational, psychological, sociological, etc. Of course, this may be implicit in the researchers’ academic disciplines, or they may opt to study effects/factors at multiple levels. The former situation is pervasive in the literature, so let’s just say that the researchers for scenario one are interested in effects. This implies that GB is the independent variable. Researchers must further specify whether this is simply subscribing to GB, or whether it’s amount of time spent on GB and/or for what purposes. And, they must specify the unit or level of analysis: individual, household, firm, etc.

The researchers are looking at both households and organizations. So, the researchers are essentially asking, “what is the impact of GB on households and organizations?” To answer this
question, researchers cannot simply compare non-subscribers to subscribers because it could very well be that these two groups are systematically different. Instead, researchers would need to observe households and organizations prior to GB and after subscribing to GB (ideally at multiple intervals since, based on theory, effects are expected to lag treatment). The researchers also need to control for systematic differences between subscribers and non-subscribers—i.e., effects are not due to GB, per se, but to other factors that cause the subjects to take up the service. The simplest way to address this is to ignore it, and to look only at GB subscribers, but it requires a set of assumptions that may be difficult to explain let alone justify. It also requires *ante facto* knowledge of who will and will not subscribe.

For scenario one, researchers can address these issues by selecting a random cohort of households and organizations to study. There are several issues here. First, the researchers must know well in advance about plans for GB. Second, presuming they must have a reasonably complete list of households and organizations, the researchers must make sure that there is not a systematic non-participation bias. For example, households of low socioeconomic status and struggling organizations may be highly unlikely to participate. The researchers in this thought experiment deal with this by oversampling households and organizations with characteristics might cause them to not participate. The researchers also work to make sure their cohort reflects Greenfield’s population in important ways, particularly demographics and line of business.

The researchers also need to define exactly what they are measuring. For the ultimate dependent variable, they focus on income—earnings for households and revenue for organizations—as an indicator of capabilities. They then use a simple model of household and organization operations to develop independent and intervening variables. The model consists of acquiring resources, processing those resources, and generating income. The researchers use
qualitative methods (interview) to create case studies for randomly selected members of the cohort to describe them prior to adopting GB. They also use these case studies, along with relevant literature, to create metrics, which they measure via survey to produce quantitative data nine months after subjects subscribe to GB and then again after the free subscription runs out at the end of eighteen months. Essentially, the surveys ask how much household/organization members spend on GB and other ICTs (information and communication technology), how the technologies are used, and what impact that usage has on the costs or income related to those tasks. And, along with the surveys, researchers conduct follow-up interviews to more fully describe the uses and impacts. This is a pretty standard, and expensive, approach, which is academically valid but has limited practical value (see, for example, Borgida, et al. (2002) and Youtie, Shapira & Laudeman (2007)).

Higher Education

The second scenario for Greenfield Broadband (GB) is even more hypothetical than the first. Scenario two doesn’t just involve a region just deploying its own broadband—which is not too unusual, although the rapidity and means of deployment in scenario one are unprecedented—it also involves universities partnering to supporting a learning process in conjunction with this deployment. Universities offer classes about business and technology relevant to a broadband project, and professors conduct research into the impacts of technology. But, it is admittedly unlikely that three universities would work together to support a regional broadband project, especially without funding. Regardless of the unlikelihood of such an occurrence, I maintain that the resulting events are quite reasonable. Indeed, I am suggesting that a different approach by universities might have huge positive effects. The next subsection substantiates both the need for
and possibilities of innovation by universities. Having said that, I should restate that the scenarios I present here are entirely fictional meant to illustrate the theory I propose in this study, to suggest how my conceptual framework can help explain learning across social levels.

An Impending Crisis?

Many universities are facing financial problems, with a shrinking portion of escalating costs going to classroom instruction, especially at research universities, tuition rising faster than incomes, and a growing gap between elite universities and those that serve the majority of students (Vedder, 2010). State budget shortfalls are squeezing public universities (Colindres, 2009; Boehnke, 2010)—but private universities are also feeling the pinch (Jan, 2010)—even “revenue generating” program such as athletics are being squeezed (Humphreys, 2010). For-profit universities are being criticized for their business practices and results (Lewis, 2007; Marklein, 2010). While college enrollment is at an all-time high (Rampell, 2010), the degree completion rates are too low and time to completion too long (Bound, Lovenheim, & Turner, 2007; Lumina Foundation, 2010).

A number of commentators see deeper issues with higher education. At a recent UNESCO world conference on higher education a researcher suggested that we are in the midst of “an almost unprecedented revolution in higher education—not just small changes around the edges, but fundamental changes” (Redden, 2009, paragraph 3). Others see more than change, they see calamity: a higher education “bubble bursting” (Barone, 2010), going extinct (Sines, 2009; Lipton, 2010), melting down (Godin, 2010), or just becoming irrelevant (Hanson, 2008). None other than Bill Gates of Microsoft predicts that the technologies will make place-based colleges good for little more than parties (Young, 2010).
While finances are a factor, these observers see other root causes. Technology could increase access and quality. Instead, costs are rising as educational technology leaps ahead and quality is slipping as more people enter higher education (Barone, 2010; Redden, 2009; Vedder, 2010). College experiences in and out of the classroom bear less and less resemblance to students’ life experiences (Hanson, 2008), and college degrees fail to keep pace with the evolving needs of employers (Schwartz, 2006), while academic disciplines are increasingly fragmented and disconnected from each other (Hollingsworth, 1986; Rowland, 2002; Weislogel, 2008). Best selling author and internet marketing expert Seth Godin, enumerates what he sees as the core problems:

1. Most colleges are organized to give an average education to average students. ... They are mass marketers ... emphasizing mass and sameness and rankings.
2. College has gotten expensive far faster than wages have gone up. ... As a result, there are millions of people in very serious debt.
3. The definition of ‘best’ is under siege ... The more applicants [universities] reject, the higher they rank.
4. The correlation between a typical college degree and success is suspect.
5. Accreditation isn't the solution, it’s the problem ... uniform accreditation programs that have pushed high-cost, low-reward policies on institutions and rewarded schools that churn out young wanna-be professors instead of experiences that turn out leaders and problem-solvers. (2010, paragraphs 3 - 13)

The functions and functioning of higher education is a regular blog topic for Rich DeMillo (2009), Distinguished Professor of Computing and Management at Georgia Tech, former Dean of the Georgia Tech College of Computing, and technology entrepreneur and executive. He maintains that:

There are no statistical control charts for higher education, and models borrowed from manufacturing and social science are leading college administrators seriously astray. The real disruptors are MIT’s Open Courseware, peer-to-peer tutoring ..., social networking sites like Atlanta’s OpenStudy.com, and online exchanges. These are the worlds that are colliding, and if they do, the next economic bubble to burst will be American higher education. (2009, paragraph 9)
DeMillo (2010a) sees the ephemeralization of higher education—disassociating the learning content from the physical place and experience—as inevitable and desirable, at least for the first couple years of general education requirements. He derides the majority of universities for not doing a better job of graduating researchers to fuel America’s innovation engine (DeMillo, 2010b). Most traditional universities cannot—but must—face the possibility of their extinction, maintains another Georgia Tech professor, Dick Lipton (2010), and fundamentally change their functions, focusing on what they can do better than non-traditional universities: advanced degrees, innovation, and research. Lipton, too, echoes Gates (Young, 2010) when he notes the traditional universities may be better at networking and socializing student, but not at basic education.

Economic historian and director of the Center for College Affordability and Productivity at Ohio University, Richard Vetter (2010) notes that, “[b]ig change is being resisted at all costs” and dismisses talk about “the 3 ‘A’s’—access, affordability, and accountability—as “rhetorical flourishes” (paragraphs 11-12). Instead, he calls for more “attention to the three ‘I’s—information, incentives, and innovation” (paragraph 12). Universities have far too little information about their performance, he insists, pointing out that “[f]or a sector that worships research, the amount of money devoted to R and D towards improving higher education performance is pathetic” (paragraph 12). Vetter calls for incentives to be aligned with goals, rewarding professors who teach a lot and well, administrators who streamline operations, development that doesn’t compromise principles for funding, and universities that admit students rather than turn them away. Increased information and realigned incentives will result in better and more innovations, according to Vetter.
The Innovation Imperative

Many in and out of academia see the fundamental, structural issues facing higher education. The general solution is innovation: a profoundly new and radically different approach, or the process transforming knowledge into improved or new products and services. Higher education needs innovation even as universities are seen as critical to innovation. In a knowledge economy innovation is the economic imperative, and society is the overall beneficiary of the imperative. Unfortunately, many are left out of the knowledge society (David & Foray, 2002), and many are displaced by transition to a knowledge-based economy, particularly those with less education and fewer skills (OECD, 1996; Powell & Snellman, 2004). Thus, universities have roles as a consumers, generators, and supporters of innovation.

Innovations, as things, evolve via variation and selection in their environments, Nelson and Winter (1977) tell us. “Most innovations … especially the successful ones, result from a conscious, purposeful search for innovation opportunities,” Drucker (1985, pg. 5) maintains. Innovations do not necessarily come from producers, points out von Hippel (1988), they can come from those who use the innovation or those who supply components, as well as those who manufacturer the innovation. Not only is innovation a distributed process, it often involves informal know-how trading between firms, even competitors (von Hippel, 1988). Inter-firm networks—which can be seen as an alternative to hierarchies and markets—are essential to producing and capitalizing on innovations, particularly during periods of rapid growth; domination by a single large organization can impede innovation (Freeman, 1991). Abernathy and Clark (1985) look at innovation as a contingent and evolving process, based upon interplay between competitors and their customers in the market place.
The ability of an organization to recognize a useful innovation and incorporate it into practices or processes depends on prior collective knowledge, according to Cohen and Levinthal (1990):

[P]rior knowledge includes basic skills or even a shared language but may also include knowledge of the most recent scientific or technological developments in a given field. … [It] confers an ability to recognize the value of new information, assimilate it, and apply it to commercial ends. These abilities collectively constitute what we call a firm’s “absorptive capacity.” (pg. 128)

Optimal absorptive capacity requires a balance between diverse, specialized knowledge unique to individuals and generalized knowledge common to all. Failure to invest absorptive capacity early and continually, say Cohen and Levinthal (1990), can result in “lock-out” from particular technology, intentional ignorance of “not invented here” new technologies, and self-reinforcing reactive innovation and under-investment in knowledge. It can be nearly impossible to explore new markets and technologies while exploiting existing ones (March, 1991).

Innovation depends on “a set of institutions that will allocate resources appropriately over a wide range of circumstances and time” (Nelson & Winter, 1977, pg. 40), and “underlying technologies, the nature of the demands for the goods and services, and the characteristics of the organizations supplying them” (pg. 41). Chapter 1 of this dissertation features a review of literature on learning regions (Florida, 1995), the concept of innovation as interactive learning (Morgan, 1997; Cooke, 2002), and the triple helix metaphor (Etzkowitz & Leydesdorff, 1997; Etzkowitz, 2008). Place is important to innovation because it allows for dense, intense, and supportive interaction across sectors (Piore & Sabel, 1984; Porter, 2003; Asheim, 2003; Breznitz & Taylor, 2010).
Universities can interpret the innovation imperative in two ways. The most explicit interpretation is that regions and organizations need higher education to meet this imperative. Individual firms or small clusters of firms can innovate, but it simply isn’t practical for a region to support innovation across multiple firms without a university. The second interpretation is that universities need their regional neighbors in order to innovate. Universities need to learn from and with other strands of the triple helix at least as others need universities’ resources. Indeed, a primary driver of universities’ need to innovate is the need of governments and industries (and, individuals) for innovation support.

Table 4 Approaches to Fostering Innovation

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<th>Open Innovation</th>
<th>Strategic Innovation</th>
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<td>(Chesborough, 2006)</td>
<td>(Christensen, 1997/2006)</td>
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<tr>
<td>• External ideas and means to market</td>
<td>• New customers and new technologies</td>
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<tr>
<td>• Entrepreneurs and outsourcing</td>
<td>o Starting at the “bottom” of the market</td>
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<tr>
<td>o “Laboratories”</td>
<td>• Learning and “theory testing”</td>
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<td>• Internal venture capital</td>
<td>• Internal start-up</td>
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<tr>
<td>o Intellectual capital as well as financial</td>
<td>• Different people, policies, processes, purposes, etc.</td>
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<td>• Mobility and knowledge markets</td>
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Organizing to innovate. Two complementary approaches to fostering innovation emerged out of, and explicate, the concepts and issues discussed above (see table 4, above). The first approach, introduced by Christensen’s *The Innovator’s Dilemma* (1997/2006), is to explore disruptive innovations by methodically testing new business models to deliver new value to new customers in new ways, and is referred to as “strategic innovation” (Govindarajan & Trimble, 2005). The innovator’s dilemma is basically the problem identified by March (1991) of exploitation and exploration being mutually exclusive. Christensen (1997/2006) details why this
is true even—especially—for well-managed organizations: exploiting and exploring are different competencies. Technologies can develop faster than markets, and keeping close to customer can cause organizations to miss innovation opportunities. Similarly, competence at delivering incremental innovations can blind organizations to disruptive innovations.

Christensen (1997/2006) maintains that firms are embedded in “value networks” that parallel market architect—who supplies what components to whom to create value—and constrain capabilities to develop technologies, tolerate failure, produce goods, and make money. Disruptive technologies are antithetical to existing value networks, even to the point of threatening existing power relations. They involve wholly different value networks in providing simple and inexpensive means of achieving valued outcomes that are difficult and expensive with existing products. More fundamentally, the information required by firms to make reasonable decisions about disruptive innovations simply does not exist, particularly in existing value networks. For these reasons strategic innovation necessarily involves creating a separate, independent, and fully resourced unit.

Govindarajan and Trimble (2005) discuss “CoreCo” and “NewCo,” with the former being the existing company and the latter created to explore some disruptive innovation. They suggest that NewCo must simultaneously “forget” CoreCo’s practices, processes, and even values, “borrow” CoreCo’s expertise, supply chain, etc., and learn about the new technology/customer set. This is a difficult proposition, to say the least, but will give NewCo a competitive advantage over its competitors. CoreCo provides scaffolding for NewCo’s network, providing a base of prior knowledge to draw on but also the opportunity to develop new knowledge via acquisition, experience, and observation. Kim and Mauborgne (2005) maintain that the fundamental goal is creation of new, unique benefits for consumers at a low cost; they call this “value innovation.”
The key, they maintain is “fair process,” including engaging stakeholders in decision-making, explaining the situation fully, including financial and operational issues, and being clear about what stakeholders can expect to result (and actually following through on those expectations). Such process allows strategic innovation by existing or start-up firms. Govindarajan and Trimble (2005) suggest “theory-focus planning,” which involves developing hypothetical propositions about how the new business works then methodically testing those propositions, as the fundamental practice of strategic innovation. Indeed, the very purpose of NewCo is to provide a laboratory for conducting such tests. Note that fair process and theory-focused planning are complementary rather than mutually exclusive.

The second approach to fostering innovation is open innovation. “Open Innovation means,” Chesbrough (2006, pg. 43) tells us, “that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well” (pg. 43). This seems so apparent and simple, particularly in light of the literature discussed above, but it is a remarkable break with previous “closed” practices. The key to achieving open innovation, according to Chesbourgh (2006), is to practice R&D as knowledge connection rather than knowledge creation, particularly by learning from customers but also by contributing to erstwhile competitors. Another aspect of open innovation is fully engaging internal personnel in the innovation process via intrapreneurship, shop floor innovation, and participative management (Pinchot, 1986; Nonaka, 1998; Ichniowski, et al., 2000).

Generally, open innovation is enabled by the Internet and related technologies. These technologies make it nearly costless to involve almost anyone in producing knowledge, to do so in an ad hoc, highly flexible and responsive manner, and to do so from most anywhere, or everywhere (Shirky, 2008; Godin, 2008; Friedman, 2005). The organizational model for open
innovation is not new (see, for examples, Brafman & Beckstrom, 2006), but it can now be done on a much larger scale (see, for examples, Friedman, 2005, and Tapscott & Williams, 2006). Tapscott and Williams (2006) suggest that open innovation enabled by the internet is forming the basis for a new, networked economic structure based on collaboration and cooperation rather than competition. The hallmark is providing critical data to which anyone might add value—as they see it—along with a means and rationale for doing so (e.g., software tools and monetary rewards). Gladwell (2002), Brafman and Beckstrom (2006), and Godin (2008) all discuss the dynamics of highly open, idea-oriented organizations. Essentially, this involves empowering others to act together based on a reasonably simple set of practices and principles, and providing a “court of last option” for resolving disputes.

Universities can capitalize on open innovation and strategic innovation (summarized in table 1) by evolving from their origins as knowledge warehouses, through functioning as knowledge factories, to acting as knowledge hubs (Youtie & Shapira, 2008). The literature reviewed above suggests that universities could foster innovation by building knowledge-based communities (Lave & Wegner, 1991; Voosen & Conneely, 2005) of individuals and organizations to flexibly build on unique local ordinary knowledge by connecting it to global specialized knowledge. Open innovation and strategic innovation provide approaches for developing such a community-based approach to innovation.

In terms of the B-C-V (behaviors-connections-visions)/W7TH (how, that, what, when, where, who, why, whether, which) framework, higher education is a situation in which the B-C-V of students, faculty, and administration are complementary but misaligned. The expressed vision is scholarship in support of democracy and freedom, but the enacted connections are for fun, standing, and power. These functions are not particularly valuable outside higher education.
Thus there are internal and external inconsistencies with higher education, and the underlying elements are set up to maintain if not increase those inconsistencies. The fundamental issue seems to be that higher education is simply too closed and inflexible. The risk is that it will become less useful as an institution and will wither in relevance. The solution—greater openness and responsiveness—can be seen in open and strategic innovation, but comes from community. In spite much rhetoric to the contrary, universities are networks and organizations, but not communities to the extent that each is pursuing her or his own interests but not the collective, long-term interests of the institution. In other words, higher education has a lot to learn if it is going to thrive in the 21st century.

Thought Experiment: Linking Broadband and Higher Education

Now I will suggest what might happen in and around the fictitious city of Greenfield, Georgia, if universities were involved as facilitators of community-learning about broadband. Imagine that early in this scenario, the scion of the Greenfield Regional Foundation (GRF) attends a conference on innovation and higher education, and listens to a panel of universities in the southeast. Three of the six panelists happen to be from major universities in metropolitan areas about an hour and a half drive from Greenfield. The panelists are discussing knowledge networks and learning communities as means to foster innovation, and how universities can capitalize on this. At the end of the discussion, the scion stands up and asks, “We’re building a regional broadband network. Could your universities create learning communities to help us make the most of it? How might it help your universities to help us?”
The Identification Function

The scion’s question illustrates the identification function. The scion recognizes a potential support mechanism for her region. The panelists, all tenured chairs or directors, recognize an opportunity. They and their colleagues need to do research, and prefer to teach small, high-level classes. The value of the opportunity to the panelists depends on how Greenfield Broadband (GB) aligns with their objectives—tactical, as much as strategic—whether there is financial support and the universities competitive stances. The panelists envision positive valence from connection to the scion, and their competitive connections to each other do not allow them to capitulate. Thus, their behavior is to jointly solicit more information from the scion.

The Greenfield Regional Foundation (GRF) has just committed the seed funding for the broadband network, regional institutions and organizations are being enlisted, and GRF is looking for a private partner—the easiest option seems to be basically just contracting with Major Telecom to build and run the network. But, the foundation board members realize that there are various non-traditional ways to deploy broadband. GRF is looking for approaches that will have maximum impact. Does this connection change the behavior (and vision) of the universities? It depends on the amounts and types of information and materials that flow from GRF to the universities, and vice versa. This flow might consist of prestige and research funding for the individuals. If they see those resources as adequate for their purposes and appropriate to their institutions, then they have fully identified with GRF and the scion.

The strength of the identification function is seen in how behavior changes, implying changes in connections and visions. The valence of connections and the clarity and strength of vision are evident in behavior. For this scenario, imagine that the universities agree to contribute
a professor for 18 weeks over two years and two part-time student assistants for 24 months. The foundation agrees to buy out one course per semester for each professor, cover travel costs, and provide facilities and materials for the collaborators. The universities propose to create inclusive, open, peer-based learning communities, focused on getting maximum benefits from broadband. They initially concentrate on sector-based communities of interest, but agree to help with whatever focus the participants decide on. There are GB-specific (Greenfield Broadband) learning opportunities with face-to-face discussions about operational and strategic issues, as well as about broadband technology. The learning communities are supported by a social media system that allows participants to stay connected and coordinate between meetings. The GRF (Greenfield Regional Foundation) commits to engage regional players, and to work with the universities to seek support from state and federal governments, foundations, and corporations, particularly ICT companies. With these roles identified, the GRF and universities begin integrating around GB.

The Integration Function

The integration function occurs as agents attend to models and respond to stimuli by practicing. In this hypothetical scenario, the professors, scion, and GRF board and staff meet, identify techniques for tapping local ordinary knowledge and connecting it with global expertise, and develop “best practices” for participants. The scion encourages the universities to look at this as innovation in higher education, partly because she sees the need this as a need for GB, and partly because she recognizes the professors’ needs for research and the students’ needs for real world education. The professors, scion, GRF board members, and others (the GB “partners”) agree to approach GB development as a regional learning process rather than a regional
broadband planning process. This means they focus on discovery what can be done with broadband rather than on building a network or providing internet service. Broadband is approached as a means to an end, rather than an end in and of itself. The end is to increase human capabilities, and the goal is to learn.

One of the first learning communities focuses on building a regional broadband network. Composed of diverse stakeholders, this team looks at numerous other technology projects, not just broadband projects, as models. It subdivides into teams focused on technical, operational, and financial aspects of the effort. All the sub-teams come back together in a public session to present the options. The consensus is to create a cooperatively owned “wholesale” fiber and wireless (not just wi-fi) network, with entrepreneurial “retailers” selling broadband services. The universities will get bandwidth and facilities for research projects. Technology companies large and small will be recruited as partners. The areas (neighborhoods) of the region that demonstrate the most demand and ability to use broadband will get service first. They decide to organize the co-op around technical, operational, and financial teams, connected by a strategy team with members from the other teams. One of GRF’s (Greenfield Regional Foundation) first actions is to hire persons to lead each of these teams.

The GB (Greenfield Broadband) partners (GRF, GB team leaders, and university personnel) decide to instigate customer teams for business & industry, government, and non-profit organizations, and they develop workshops on how to set up neighborhood tech teams. Each of these teams starts with discussions of participants’ strengths and goals. From this the partners identify experts and resources aligned with team members’ interests. The partners encourage the teams to identify problems to solve or projects to undertake using ICTs. So, for
example, the business & industry team decided to “consult” with one of the members—a manufacturer—as they choose and implement an enterprise resource-planning (ERP) system.

The neighborhood tech teams are organized via social marketing: People are asked to host meetings with friends in their homes, churches, bars, etc., to talk about what broadband is and what it could do for them. What is it that citizens might do with broadband? They say: searching, shopping, and socializing. People say they wanted to improve their educations, but it becomes clear that they really want is to increase household income, do meaningful work, and have plenty of leisure time.

These views cause some concern among the other teams as they realized they do not have online content and services to meet people’s needs. The other teams realize they need people to use broadband as citizens, consumers, employees, etc. They also realize that members of the neighborhood tech teams are associates, friends, relatives, etc. And, as persons, members of the business & industry, government, and social services teams share the interests of the neighborhood tech teams’ members. In other words, the sector team members identify with the neighborhood tech teams members.

Between the input from the neighborhood tech teams and the ideas from expert connections, the sector teams realize they have to figure out how to create meaningful, useful content for individuals. The sector teams take their goals to GB partners, with detailed requests for knowledge. They need to know how to interact with citizens, customers, employees, etc., online. They need to know what hardware, software, support, and training their organizations would need. They need to know how to finance all of this and generate revenue from it, or at least save some other costs. The sector teams develop shared visions—along with connections and behaviors—based not so much what they know as what they need to know. In the process
they become integrated, which is a direct result of identifying with the neighborhood tech team members.

The Differentiation Function

This is the point at which differentiation hypothetically begins. The actors fall into roles that allow them to make unique and valuable contributions to the effort. This function, more than the others, serves innate drives. Differentiation provides maximum capabilities gain. Identification and integration functions don’t cease. Differentiation is layered on them, and they are focused and specified. The sector teams, for example, set up formal positions to help team members and their customers use ICTs. The learning communities begin to formalize around particular purposes, which align with their formal organizational roles. The GB teams set up standardized finance, operations, and tech roles to lead development of GB. Some neighborhood tech teams get lots of participants pre-subscribed to GB. Others get more motivated and organized as GB is deployed to the neighborhoods with the strongest teams.

Differentiation doesn’t just serve the needs of the differentiated individuals, as they are helping or serving others. The citizens of Greenfield, clients, customers, patients, students, etc., benefit from differentiation. It improves organizational performance via division of labor, increases personal fulfillment, and contributes to regional advantage. Differentiation is the hallmark of strong community. Each community input function results in increased capabilities, but differentiation is a big leap in drive satisfaction and real freedoms. The individuals that step into the various roles on each team benefit socially and psychically, if not financially, from their work, and their work benefits others. They help the region get and use broadband and other ICTs.
Each team is differentiated by its focus and actions. The education-sector team focuses on success in the classroom, finding curricula, content, and assessment tools. They are also concerned about engaging parents and getting technology in the hands of all kids. The major issue for the healthcare sector team is access to and integration of clinical information systems. Physicians and other professionals are interested in practice management software. They are aware of the burgeoning and sometimes dubious health information available online, but are unsure how to deal with this information, let alone capitalize on it. The government team is primarily focused on geographic information systems (GIS) and fleet management, along with some interest in citizen services and “digital democracy.” The safety & security team is concerned with similar issues, but one of their major goals was to get data connections to ambulances, fire trucks, and police cruisers. They also promote surveillance technologies. The business & industry team has numerous committees with specific interests—asset management, computer-aided design, content management, customer relationship management, inventory management, etc.—and sub-sectors. The cross-cutting interest for all teams is personnel. Where are they going to find the employees with the capabilities needed to deploy and use these technologies? And, the teams are all concerned about paying for the technology.

Creation of the teams depends on identification, and collective capacity is precipitated via integration. Differentiation enables the teams to be successful, as individuals step up and, in their individual ways, take action toward teams’ purposes. The resources associated with each role draws in persons and organizations that need the resources. Rules define how to access and disburse those resources. Identification and integration set the stage for differentiation to emerge from practice via feedback and reflection. Knowledge about practices, criteria for those practices, and means for feedback and reflection are implicit in each team’s focus and purpose—
its whether, which, and why. There is tacit knowledge flowing through the teams about how to use technology and avoid technological pitfalls, as well as explicit knowledge about the technology. Each community input function involves explicit knowledge about the teams—who are the people, what are the purposes, and how do they operate—as well as tacit knowledge about the teams. Each team has different behaviors, connections, and visions, which are affected differently by each community input function.

The Impact of Community-Learning on Broadband Adoption and Use

So what are adoption and use of GB (Greenfield Broadband) like in this scenario? Quantitatively, adoption is similar to scenario one, but it is qualitatively different. The rate of adoption, for instance, is really the rate of deployment because in this scenario GB is deployed in response to clear demand. By the time GB construction begins, over half of the residents have signed up through their neighborhood tech teams. The measured deployment rate was a cost containment and quality assurance tactic by GB rather than a response to growing demand. The approach was adopted based on researching successful ICT (information and communication technology) projects, and because the partners approached GB as a learning process rather than just a network deployment project.

Use is also qualitatively different. More time online is spent with others in this scenario than in the first because the teams worked together to create social learning opportunities. The GB strategic team wanted customer insights and early subscriptions. The sector teams wanted to make sure Greenfielders are engaged as customers, employees, etc. And, the neighborhood tech teams wanted Greenfielders to connect via GB because they get a variety of rewards for drawing
in subscribers. So, numerous stakeholders are aligned—have similar behaviors, connections, and visions—around Greenfielders getting and benefiting from GB.

The differences between the first scenario and the second are largest at the organizational level. With the support of the university personnel, organizations around the Greenfield region invested aggressively in ICTs (information and communication technology) because they learned what ICTs could do for them. Through the learning process, organizational leaders saw the need to proactively deploy online content and services, and to develop their organizations’ technological capabilities. The teams offered a wide range of opportunities to gain hands-on experience with or learn the details of a solution, system, technology, etc. They provided a highly supportive environment in which different organizations learned together about common applications. Possibly most important, the teams developed a way to finance ICT investment, including software, training, web sites, etc. All of this happened as and before GB was deployed, with assistance from the university partners and technology companies. So, by the time GB was available, many companies were already digitizing their processes and developing online systems for interacting with customers, employees, and suppliers. Some of this work was sector-focused, such as using GB to improve communications for emergency personnel. Other efforts, such as “Business Basics” training for any person who might use computers at work, were broad-based. The teams spun up groups for techies and for executives to sharpen relevant abilities.

Over one thousand organizations signed up for GB in its first month. On average, within a month (after or before) signing up, commercial subscribers increased ICT spending by $2,000, and more than half of that was spent with local companies, representing a $1 million dollar boost for the local tech economy. Over the 18 months of the initial GB period, this number trended upward. Organizations were spending an average $4,500 per month. Over $2,000 of this was
local. The number of organizations subscribed to GB increased quickly, and they increased ICT spending after subscribing. Organizations reported that ICT enabled them to cut costs, increase revenue, and launch new products and services, resulting in an average increase of $8,000 per month per organization. And, Greenfield’s organizations trained existing employees, and hired more and better-paid personnel, in order to achieve gains by being more productive with ICTs.

A wide range of organizations also helped promote GB, supported training opportunities, offered special deals on technology. A non-profit umbrella organization, for example, worked with a number of technology companies to get a bulk discount on computers and web services for other non-profits, their employees and clients. In focused discussions jointly convened by the customer sector and neighborhood teams it was suggested that churches, salons, stores, and taverns were good places to introduce people to the internet. Another suggestion was to recruit older community members to be internet ambassadors, by giving them computers with high speed internet access to share with others. The ambassadors could even earn extra cash by getting people signed up for GB or renting their computers to others. This tactic effectively transformed the region’s matrons and patrons into entrepreneurial GB retailers. These ideas didn’t come from the community, per se; community members “stole” the ideas from other places they researched ICT projects as part of the community-learning process.

The results of community-learning for broadband were that Greenfield citizens figured out how to use ICTs across levels more rapidly and effectively than in scenario one. More individuals went online sooner, and uses were more beneficial to, connected with, and embedded in Greenfield. The critical difference between scenarios was that organizations invested ahead of, or at least with, households and individuals. While substantial local dollars and time went out of Greenfield via GB in scenario two, local organizations also used it to export, offer new and
profitable products and services, and hold their own with locals. In fact, recognizing that ICTs can enhance but not replace relationships, some Greenfield organizations built deeper and stronger local customer relationships. These relationships became the basis for innovative products and services that fueled additional organizational growth.

At a broader level, in scenario two the regional infrastructure was aligned with its institutions via the process, so that ICTs become embedded in institutional locations like classrooms, commission chambers, churches, boardrooms, and bars. Traditional leaders are effectively required to be conversant in the technology and its socioeconomic implications. And, they are expected to use ICTs, too. Overall the results were a net gain in capital—financial, human, social, etc.—flowing into the Greenfield region, and significant increase in efficiency, productivity, profitability, and household income.

This is not to say that there were no problems. It is reasonable to imagine that in scenario two a third of all ICT projects by organizations had negative or no clear value. Sometimes the technology just didn’t work, although such incidents were minimized as the community-learning process vetted particular products and technologies. In most cases of poor return on ICT investment, the technology exacerbated underlying issues with the organizations. Digitizing broken processes didn’t fix them, and sometimes made them worse. Two general and often coincident problems were, one, ICTs made a task or process more difficult, or, two, ICTs were used to layer a digital process on an analog, manual process without replacing it. The problems usually weren’t with the technology; the problems were in the organizations. While implementing organizational solutions using GB, it became clear that many organizations don’t consciously know their processes, and processes too often don’t align with purpose.
The two general, hypothetical responses of Greenfield organizations were to learn from failures and to do things differently—with ICTs—or to use ICTs as an excuse. Another result was that the sector teams began exploring non-ICT methods for increasing performance. Many of the teams conducted pilot projects in which one organization implemented a solution with the help others, in an open, collaborative manner. These experiences enabled individuals at various levels within an organization to see ICTs in action in other organizations, and to engage each other about the other organization. Such practices minimized the need for making technology a scapegoat for flawed organizations, and undermined the validity of such excuses.

Hypothetically, behaviors-connections-visions (B-C-V) changed much more in scenario two than in scenario one, as a result of identification, integration, and differentiation. Organizations connected to share information and materials about and via GB and other ICTs. They developed common and complementary visions for and with the technology. These connections and visions built on previous behaviors, existing connections, and current visions, to change in ways that increase capabilities and real freedoms. All of this knowledge came from building community around GB and ICTs. Individuals experienced increases in their senses of belonging, influence, needs fulfillment, and shared commitment via GB and the teams that were not experienced in the first scenario. In other words, individuals in Greenfield had a much stronger shared sense of community in the second scenario than in the first. The gain in capabilities and knowledge were much greater, too.

The personal, organizational, and regional prior knowledge, intentions, and motivations were initially the same in both scenarios. The community input functions—particularly identification, which fed into subsequent functions—were much stronger in the second. In the first scenario, individuals were identifying assets and interests outside the region via broadband,
whereas organizations simply weren’t identifying GB as something for them, nor were they
identifying via the internet. In the second scenario, identification by the scion and the university
personnel was just the start of the community-building process. It led to integration,
differentiation, and cascaded into additional iterations of community functions. As a result the
gains in personal fulfillment, organizational performance, regional advantage, and real freedoms
were greater in the second scenario. Not only that, in the second scenario, these factors become
complementary, feeding and supporting each other, rather than mutually exclusive as in the first
scenario. In the next section, I’ll consider in more detail how this occurred, applying and
illustrating the models I proposed in Chapter 4 in the process.

Applying Community-learning Models to Broadband

The general theory I propose is that community yields learning or, simply, community
makes people smarter. Not only that, I suggest that this theory—or, rather, community—links
personal, organizational, and regional learning. Learning—the phenomenon and process of
acquiring knowledge and increasing capabilities—manifests differently at each level. The
cognitive constructor, loops of learning, and triple helix are metaphors for individual,
organizational, and regional learning, which help us learn how learning operates across levels,
connecting the metaphors. Individuals construct reality to better meet innate drives and to be
personally fulfilled. Organizations engage groups in cyclic actions to improve collective
performance on a particular purpose. Regions afford interactions between business, government,
and university that increase advantages associated with place. Community is necessary,
hypothetically, for all of these things to occur. Community is the independent variable.
Capabilities are the dependent variable. This is where my theoretical framework makes a break with many economic and sociological approaches. For community-learning there is an ultimate good, a fundamental value, and that is human capabilities. As I discussed in chapters 1 and 2, capabilities are evident in our real freedoms, in our liberty, prosperity, and wellness. Real freedoms are reasonably easy to operationalize, to define in such a way as to be validly measurable. Perceptions or actions, for example, can tell whether people feel free to associate with whomever they please or to speak their minds. Data for assessing real freedoms can be generated by interview, observation, survey, etc., and are both qualitative and quantitative.

The dependent variable is somewhat more challenging. I suggest that community—or, at least, shared sense of community—arises from three general socio-econo-cognitive functions: identification, integration, and differentiation. The more people identify, integrate, and differentiate with others, the stronger community is. And, the stronger community is, the smarter and more capable people are. The factors of learning are important, but it is the power of these functions that determines capabilities. The functions are things that people do—actions—that can be observed. Similarities between individuals and whether they recognize those similarities can be observed. Individuals adopting, coordinating, and repeating common practices are observable, as are differentiation activities and results. Indeed, the community input functions are more amenable to conjecture and testing than the factors (prior knowledge, intention and motivation, models and stimuli, practice, feedback, and reflection). Now I will apply each of my proposed models to the thought experiment.
GB Multilevel Learning Logic Models

In the learning logic model prior knowledge and intentions and motivation are antecedent factors in the learning process. The value of these factors is determined by the identification function—the extent to which learners consciously share an interest. Let’s consider a specific situation in Greenfield, illustrated in figure 10. Various organizations around the region have capabilities for and interest in geographic topics: assessing taxes, building roads, delivering materials, handling emergencies, identifying customers, providing water, routing school buses, etc. In the first scenario, in which Greenfield gets broadband but not community, these interests are never identified. In the second scenario, actions by the GRF (Greenfield Regional Foundation) and university partners clearly identify these interests and they identify the common interests in geographic data, asset management, and improving responsiveness while minimizing costs.

<table>
<thead>
<tr>
<th>Behaviors-Connections-Visions</th>
<th>Antecedents</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Impacts</th>
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<tbody>
<tr>
<td></td>
<td>Identification</td>
<td>Integration</td>
<td>Differentiation</td>
<td>7.c. More reliable utilities, increased public safety, etc.</td>
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<td></td>
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<td>Individual freedoms</td>
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Figure 10 A Learning Logic Model for the Greenfield Geo-Tech Team

The input factors are the availability of models and stimuli, and practice. The value of these inputs hypothetically depends on the power of the integration function, the extent to which
individuals establish common B-C-V (behaviors-connections-visions). The GB (Greenfield Broadband) partners identify a range of broadband applications for geographic purposes, share them with the interested individuals, ask them to study them and share the results. They also work with these individuals to identify what defines performance and drives improvement for their organizations, particularly as it relates to geographic issues. These discussions require time and other resources. Even more resources are needed to try things out. For example, a local utility is deploying a mapping application for making work assignments, managing electrical infrastructure, and routing trucks. The utilities’ managers ask others to help them evaluate alternatives and implement a solution. Together with other organizations the utility reduces the time, money, and risk involved in deploying the mapping application. And, everyone gains understanding of how to evaluate and implement such applications. All involved also see the benefits of information and communication technologies (ICTs) more clearly, and learn how to avoid excess costs of ICTs. All participants do and see these things together, and they come to have common technologies for addressing their shared interests. They become better integrated in order to get greater benefits and better control costs.

The outputs of the learning logic model are feedback and reflection, which are essentially information from others and from self about integration, based on identities. The value of these outputs are determined by the extent to which individuals can differentiate themselves in the—what can now be called—community. The Greenfield Geo-Tech Team, as they have come to call themselves, members are recognized by the sources of their models and stimuli. In other words, their bosses and trade journals recognize and reward their efforts. The Geo-Tech Team members feel that they really belong and contribute to something that is important and benefits them and others.
Throughout this process, and the learning logic model, the factors and functions have applied differently at different levels. As persons those involved were responding to their drives, seeking fulfillment, based on their personal knowledge and capabilities. In the organizational context, individuals act for organizations’ performance based on organizational purposes, availability of capital, and division of labor. In the process, individuals are building regional infrastructure and institutions to construct advantage for everyone in the region. For Greenfield, this case results in more efficient and effective movement of goods and people. They save time and money with technology, that they can use for more valued things. They create community, find fulfillment, and gain real freedoms. Broadband provides a means for these outcomes, but it was community-building instigated by the GB (Greenfield Broadband) partners—intentionally conducting community input functions—that cause the gain in capabilities.

**GB Multilevel Learning Causal Models**

In the causal model, knowledge gain at one level can be independent of, or negatively or positively correlated to knowledge gain at other levels. My theory suggests that this is because community can exist—or not—at all levels. (It is this variance in the relationship between levels, along with different metaphors, that defines them as distinct levels.) But, the greatest levels of real freedoms arise following increases in community. So, for example, members of the GeoTech Team got promotions and raises (increases in prosperity) and less stress (increases in wellness) without having to move (increases in liberty) as a result of identifying, integrating with, and differentiating via their learning community. Incremental gains in capabilities result from information acquisition, but innovation results from collaboratively processing information into valuable knowledge. In the following example, I show how such activities redefine the
relationship between healthcare patients and their providers, as well as making healthcare practices more efficient.

Consider healthcare in Greenfield. In the first scenario healthcare providers make incremental investments in ICTs (information and communication technology); doing pretty much what they’ve always done. The people of Greenfield (patients), at least those who subscribed to GB, had a new, easy way to find information, specifically health and medical information. A specific behavior—patients coming to their doctors with information on their condition printed from the internet—is evidence of new capabilities. This behavioral change is changes in connections and visions, too. (In my conceptual framework behaviors, connections, and visions are parts of a system, and therefore have the same information content.) The patient (person) begins getting information from a different source other than her or his healthcare providers, and discovers new possibilities for disease as well as diet and exercise.

Now consider the second scenario. In that scenario, healthcare providers are identified via facilitated learning process. Other than the obvious, these people shared some interest in cardiovascular disease. It was partly the chance expertise of some doctors, but it was partly due to Greenfield having high incidence of heart disease and stroke. Desire to understand the causes of these diseases provides the seed for collecting data on vascular disease and—since its needed to understand causes—comprehensive patient information. From this, stakeholders identify needs for more health information technology (HIT).

The doctors interested in this issue work at a clinic and realize they need data from the hospitals, too. So they begin lobbying the hospitals to collect the data, which means investing in HIT and implementing electronic medical records. The doctors are clearly identified during sector team discussions on healthcare. They are not at early meetings, but others in the team
meetings mention them. The partners seek them out, have the address the team, and identify specific tasks to promote HIT. Together, they review how HIT is being implemented in other places, by leading healthcare enterprises. And, together, they realize that if healthcare providers are going to go digital, someone will have to go first for the providers to follow. Supported by GB (Greenfield Broadband) partners and their learning community, the doctors decide to take their clinic online.

This involves a lot of experimentation and careful improvements in the clinic’s operation, but has benefits within GB’s first 18 months. Specifically, doctors are able to respond to patients with information printed from the internet: It becomes a point of dialog because the doctors can look it up, along with the patients record and authoritative with the patient to decide what it means and how to address the issue. Indeed, the doctors encourage patients to research their conditions and even suggest online resources for the patients’ benefit. This not only benefits the patients and providers—increasing wellness and reducing costs—it allows the clinic, doctors (and other healthcare providers and patients), and Greenfield to be recognized as innovators. The doctors get more business, the hospitals are pressured—guided—to go electronic, too, and medical technology companies and health agencies begin thinking Greenfield might be a place to invest.

The interaction between the doctor and patient is a place to measure the impact of community-learning on the impact of broadband. The identification of interested doctors—who needed data, not technology per se—led to their integration around electronic health records, by which they differentiated themselves. Hypothetically, the strength of these functions determines whether and how the “information printed off the internet” discuss occurs and where it leads. Community results in a better and less costly response by the doctor for the patient. Both,
especially the patient, become more capable. (The doctor becomes more competent with
technology, which hypothetically heralds greater capabilities.) Their liberty, prosperity, and
wellness are enhanced much more by broadband than in the first scenario.

Table 5 Variables and Metrics for the Multilevel Learning Causal Model

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<tr>
<th>Independent variables and metrics (community input functions)</th>
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<tr>
<td>( a_1 ) Identification: Of</td>
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<td>( a_2 ) Identification: As and by</td>
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<td>( a_3 ) Identification: With</td>
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<tr>
<td>( b_1 ) Integration: Experience</td>
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<td>( b_2 ) Integration: Language</td>
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<td>( b_3 ) Integration: Purpose</td>
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<td>( c_1 ) Differentiation: Power</td>
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<td>( c_2 ) Differentiation: Reason</td>
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<td>( c_3 ) Differentiation: Skill</td>
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<tr>
<th>Dependent variables and metrics (outcome capabilities as real freedoms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x_1 ) Liberty: Association</td>
</tr>
<tr>
<td>( x_2 ) Liberty: Expression</td>
</tr>
<tr>
<td>( x_3 ) Liberty: Transaction and transit</td>
</tr>
<tr>
<td>( y_1 ) Prosperity: Earnings</td>
</tr>
<tr>
<td>( y_2 ) Prosperity: Opportunities</td>
</tr>
<tr>
<td>( y_3 ) Prosperity: Property</td>
</tr>
<tr>
<td>( z_1 ) Wellness: Conviviality</td>
</tr>
<tr>
<td>( z_2 ) Wellness: Health</td>
</tr>
<tr>
<td>( z_3 ) Wellness: Safety</td>
</tr>
</tbody>
</table>

The gain in independent variables was low in the first scenario, and high in the second.
Here it becomes apparent that identification, integration, and differentiation are really latent
variables. Table 5 contains variables and metrics for the causal model. Each of the metrics is a
version of the variable construct. Multiple metrics for each construct affords greater validity and
veracity. The metrics can be used alone, together, or with other metrics. In the HIT case the
variables might be measured by survey or interview, or observation, using psychological scales,
or with diaries or field notes. My putative theory predicts that identification will be observed
first, followed by integration, and then differentiation. Further, liberty, prosperity, and wellness
metrics will increase following and in proportion to the community input functions. In cases with
very strong community input functions, when learning aligns across levels of socioeconomic aggregation, the real freedoms become mutually supportive. That is, there will be gains in capabilities above those gains explainable by community. These relationships are illustrated in figure 10.

![Figure 11 The Learning Causal Model](image)

The conceptual framework of this dissertation includes parallel factors at each level—regional advantage from infrastructure and institutions, organizational performance from capital-labor and technology, and personal fulfillment from capacity and ability—that provide a basis for operationalizing variables at each level. The specific metrics in the case of Greenfield’s healthcare sector are (1) personnel rating the importance of technology, (2) number of attendees at, and outputs of meetings, and (3) press mentions of doctors, organizations, or Greenfield region (in conjunction with ICTs (information and communication technologies)). The measures of the dependent variables, which are also essentially latent, are number of sources of health and
medical information, earnings (number of patients and amount of fees for doctors, additional or not lost productive time for patients), and, of course, incidence and severity of disease. The measure of wellness for doctors might be job satisfaction or job-related stress.

GB Multilevel Learning Mathematical Models

The mathematical model of learning that I propose describes the theorized relationship between learning at different levels. The unit of analysis, to review, is individual human beings, who are analyzed on the personal, organizational, and regional level. So, the question becomes what are total capabilities of the individual, and how do personal, organizational, and regional capabilities contribute to that total. The factors and variables in this model are drawn directly from the literature, then are related to community input functions and capabilities as real freedoms. What does this mean in practical terms? It means that indicators and metrics, while derived from the literature, must be defined in context. This is helpful because, as discussed in Chapter 4, the ability and capacity constructs can be difficult to define as variables.

The simplest way to think about operationalizing the variables in the mathematical model is that they are resources associated with each level that the individual knows of and uses. Objectively, this reduces ability and capacity to dollar amounts. So, capacity would simply be the replacement costs of equipment, facilities, infrastructure, etc., and amount of money spent on labor or personnel, divided by number of persons, members, or residents. Ability would be the revenue generated and costs avoided by these expenditures, divided by time on tasks associated with that revenue or avoided cost. The unit of analysis is the individual, so the approach would be to identify the roles played by individuals as persons (in households), as members of organizations, and as residents of a region, calculate the objectively defined capacity and ability

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at each level. In order to avoid the danger of circularity (the dependent and independent variables being measures of the same thing), the dependent variables in this approach would need to be subjective ratings of regional advantage, organizational performance, and personal fulfillment. For example, organizational performance might be operationalized as customer satisfaction.

The subjective approach to operationalizing the independent variables would be to develop scales for individuals to rate ability and capacity at each level. So, for example, individuals would rate the availability of infrastructure and resources in their region, and the efficacy of regional institutions. In order to make these measures valid, researchers should have individuals rate themselves, their organizations, and their regions; have others rate them; and, have independent experts assess and rate them. With subjectively defined independent variables, it would be best to have objectively defined dependent variables such as economic growth of regions, organizations, and persons.

With either approach, the dependent and independent variables might be validated and verified by correlating them to measures of community input functions and capability output functions. What are individuals’ perceptions of identification with, integration into, and differentiation within their households, organizations, and regions? Or, what is the evidence of these functions in personal, organizational, and regional contexts? Similar questions can be asked about liberty, prosperity, and wellness. Hypothetically, there should be a significant positive relationship between dependent variables and community input functions, and between independent variables and capability output functions, because they are essentially indicators of the same underlying phenomena. A hybrid approach would be to replace the dependent variables with measures of community input functions, or replace independent variables with measures of capability output functions. Such an approach moves beyond the mathematical model’s purpose
of describing relationships between levels because the input and output functions operate at all levels. Regardless of approach, it should be clear that applying the mathematical model could be rather difficult and expensive.

For GB (Greenfield Broadband), personal capabilities might be measured in terms of how individuals spend their money and time. The money represents their capacity, and allocation of that money represents their ability. For organizations, ability equates to division of labor, including automation, and capacity is essentially their capital and labor. Infrastructure represents capacity at the regional level, and institutions represent ability. Regardless of the metaphors, I hypothesize that certain arrangements at each level lead to major increases in value. (Value can be defined as a gain in capabilities but also as improvements in connections and/or visions.) Using capabilities in certain ways increases capabilities. Those certain ways are community, specifically identification, integration, and differentiation. The use of capabilities to carry out these functions explains a significant amount of the variation in how people spend their money and how much money they have to spend.

In the first GB scenario, without the university partners, although there was investment in regional infrastructure, (a) adoption and use were relatively small compared to other types of infrastructure, and (b) adoption and use did not impact regional institutions, the ways in which churches, schools, government, etc., worked. Nor were there notable changes in organizations’ capital base, labor pool, or processes. At the individual level, GB users were very different from other Greenfield citizens, and from themselves prior to GB. The community input functions did not occur at the organizational and regional levels, but they did occur at the personal level. Individuals used GB to extend and restructure their communities. For many of those individuals, the result was both beneficial and desirable, increasing their information and materials. GB
helped them to be more liberated, prosperous, and well, generally speaking, with some exceptions. But, while individual capabilities benefited from personal use, there was little if any contribution from organizational and regional factors.

The second scenario featured much higher levels of identification, integration, and differentiation. Essentially, what the mathematical model says is that variation in individuals' capabilities are largely explained by community input functions at all levels. The actions of the GB partners—the GRF (Greenfield Regional Foundation) staff and board, and the university professors and assistants—catalyze identification, integration, and differentiation. The partners work through the learning factors at each level, and conscientiously link them across levels. Regional institutions are transformed by learning from experts and interaction. Organizations, similarly, restructure their processes and division of labor. These are done in conjunction with individuals’ ability improvements via and with internet technologies. Thus individuals’ competencies are better aligned with organizational performance imperatives, based on regional advantage.

Around Greenfield, in the tractor industry, ICTs (information and communication technology) are at first ignored then rapidly adopted and enthusiastically used. The adoption curve was so steep for the industry because multiple firms, through their executives and managers, studied the value of digitization from the automotive industry. With the support of the GRF (Greenfield Regional Foundation) and university experts, the tractor industry developed standards, demonstrated business value, and invested the necessary resources. This enabled tractor companies and companies in allied industries to restructure their process—increasing capital in ICTs and skilled labor, while decreasing capital in facilities and inventory—and boost
their profitability (performance). Individuals saw increases in household earnings as the tractor industry hired more skilled workers and trained existing workers to do more technical tasks.

The GRF and the university partners provided the institutional counterpart to GB’s infrastructure. That change explains a significant amount of the variation in organizational performance with ICTs, both between scenarios and within the second scenario. Community-learning catalyzed by GB, facilitated by the university partners, and supported by the GRF is the difference. The difference from community-learning was especially great because regional, organizational, and individual learning about ICTs was aligned in the tractor industry: Cognitive constructors were linked in loops of learning embedded in a triple helix of interactive learning.

The mathematical model of my proposed theory should allow it to be tested with empirical data. Both the relationships between levels can be explored, as can the impact of community on capabilities at each level. An interesting issue that is beyond the scope of this dissertation is the shape of the curves. I provide linear, multivariate regression. For particular technologies the community functions translate into the three portions of the learning curve. But are there more complex relationships between capabilities and community between or within levels? This issue is intellectually interesting and has practical, strategic implications.

Integrating the Models

As noted above, the tractor industry has a strong presence in and around Greenfield. By the time the scion began contemplating the possibility of bringing broadband to the region, the industry was beginning a slow decline due to the combination of changing consumer preferences and foreign competition. Micro, meso, and macro level B-C-Vs (behaviors-connections-visions) related to tractor production were not changing as fast as the market realities. Those in the region
could not know that trend would accelerate and would interact with the “Great Recession” in 2009 to decimate their industry. At least, that’s what would happen in scenario one, in which the industry did not adopt and use GB (Greenfield Broadband).

In scenario two, the prior knowledge of tractor production was connected at the micro, meso, and macro levels to non-local expertise, facilitated by the university partners. This identification function resulted in tractor industry leaders seeing models and stimuli to change their practices. The executives and top managers of tractor manufacturers, their suppliers, and even local customers came together and began working together to understand the value of broadband and other ICTs. Those who participated in this process were most able to capitalize on GB, as discussed in the previous sub-section on the mathematical model. They were also able to differentiate themselves in terms of the technology use, growth, and overall organizational performance. And, when the “Great Recession” came they not only weathered the storm, they were able to sustain their growth via innovation.

The community-learning process resulted new connections that were critical to the industry. One connection was to the Geo-Tech Team, another was to healthcare. The Geo-Tech Team became something of a new institution for the region by acquiring explicit knowledge about geographic information systems (GIS), building tacit knowledge about collaboration and culture, and combining these into implicit knowledge. B-C-V at the micro, meso, and macro levels changed. Families took up geo-caching (a past time that involves searching for hidden caches based on geographic clues). Geography became a touchstone topic in education, and was used across the curricula in math, reading, and science. And, the Greenfield tractor industry led the industry in using GPS (geographic positioning system) to automate tractors. An industry
consortium literally set the standards for this, and a local startup became a global sensation when it began selling a robotic lawn mower based on the technology.

Connections to the healthcare industry arose from the tractor industry’s need to boost worker productivity. The university partners noted early on that healthcare costs, absenteeism, and injuries were major impediments to organizational performance in the industry. So they identified individuals in each sector whose personal, organizational, and regional prior knowledge and intentions/motivations were complementary. The partners brought these individuals together to review models for collaboration between healthcare providers and manufacturers, and engaged insurance and government officials to offer targeted wellness incentives as stimulus. Together all of these groups created a wellness “dashboard.” They identified employees of participating tractor industry companies and their families. The healthcare providers worked with technologists, sponsored by government agencies and private companies, to aggregate these persons’ health data in a way that protected their privacy. The dashboard allowed individuals to create a wellness plan, track their progress, compare their wellness with others, and mutually support each other. Then everyone employees, employers, health professionals, etc., came together for “Fun & Fit Together,” a weekend long program to set wellness goals and come up with ways to meet those goals. Everyone participated as a peer, since the best expert on any person’s health is that person. The overall vision they established was “America’s healthiest community by working together for each other’s wellness.”

Fun & Fit Together significantly reduced disease incidents among participants, decreased absenteeism, increased productivity and earnings (for organizations and individuals), and created a situation in which persons were able and willing to share their ideas for increasing wellness. It made liberty, prosperity, and wellness complementary. Not only that, it created other
improvements and innovations. A small innovation was the tractor industry creating a network of in-house wellness centers where employees could consult with doctors, nurses, occupational therapists, and personal trainers. A big innovation was a robotic surgery startup that was conceived when an engineer turned surgeon and a tractor industry robotics expert met during Fun & Fit Together.

In these examples—collaboration between the tractor industry and the Geo-Tech Team, and with healthcare providers—we can see how the community-learning process results in micro, meso, and macro level capabilities gains. We can also see the cascading feedback/feed-forward of community input functions: how identification can lead to additional identification as well as integration, how integration leads to more identification and integration as well as differentiation, and how differentiation feeds into all the community input functions. We can see these things through the lens of the three models I suggest. The mathematical model enables us to explain variation in capabilities between and within levels as a function of community. We can examine the ways in which the community input functions lead to increased capabilities and real freedoms with the causal model. And, the ways in which the factors of learning fit into a process that results in micro, meso, and macro level impacts is evident with the learning logic model. The usefulness of these models for strategy, planning, and evaluation is implied by the examples. We might even stretch the thought experiment by saying that the university partners had these models at their disposal and used them as a practical and theoretical basis for their work. While this may stretch the reader’s credulity a bit too far, it does suggest the implications of this dissertation for research and practice.
Paradoxes and imperatives

The internet paradox and the productivity paradox can both be seen as artifacts of learning, at the macro and meso as well as micro levels. Social isolation from use of a nominally social technology result from families and regions, as well as individuals, learning how to connect via the internet. The learning involves fundamental changes in the structure and function of institutions (like the family). These changes take time, resources, and effort. During that time the individuals and institutions involved inevitably perform at lower levels. The same can be said for organizations as they work to adopt (and adapt) and use ICTs (information and communication technology). As they re-organize to capitalize on ICTs, organizational performance necessarily declines temporarily. Hypothetically, capabilities not only rebound, they are greatly increased—at macro, meso, and micro levels—as a result of learning to use the technology.

The Greenfield broadband thought experiment illustrates how the process of community-building, in which identification, integration, and differentiation feed into and reinforce each other, can greatly increase capability gains. As discussed above, economic pressures are driving profound change at all levels. Deploying broadband does not alleviate these pressures, or lessen innate human drives. Innovation does, but it can be very costly and risky. Community reduces these costs and risks, and boosts the autonomy, belonging, competency, etc. So, community hypothetically enables innovation, which makes sense if we think of innovation as a general form of increased capabilities, involving new knowledge and leading to gains in real freedoms.

These points are illustrated by what happened for the university partners in the thought experiment. In the first scenario, not only did the universities not realize any gain in capabilities, they were totally disengaged, not even in the picture. In the second scenario, the university
partners acted as learning facilitators, but they also learned a great deal in the process. The universities learned to engage organizations and regions, as well as individuals, as learners. The universities learned to capitalize on a new technology, and it wasn’t broadband. It was community-learning. The way in which the universities accomplished this was a essentially a combination of open innovation and strategic innovation, drawing in knowledge from customers and peers, and creating a functionally different, new unit in Greenfield to do so.

The need and opportunity to step out of the “sage on the stage” role allowed the university partners to improve their outcomes by collaborating as co-learners. The learning that resulted in the second scenario had unprecedented scope, extending across multiple organizations that the universities would have been unlikely to reach otherwise. The universities were able to achieve these learning outcomes with relatively few personnel because they simply (so to speak, for this type of learning would be no simple matter) initiated and supported the community input functions. One the most profound transformation in this thought experiment occurred for the universities as they built a highly innovative and impactful partnership, linked to place, among their institutions through their work with Greenfield Broadband.

Researching Scenario Two

The research approach implicit in scenario two is nearly as much of an innovation as the universities’ educational practice. It involves the university personnel learning along with their “subjects.” Rather than the universities “doing studies,” everyone studies together. The university personnel don’t act as teachers or traditional researchers. Instead, they provide structure—“scaffolding”—for the learning along with others, gathering data together in the process. The process was essentially loops of learning, as discussed by organizational thinkers.
(Argyris & Schön, 1978; Deming, 1986; Liker, 2004; and Senge, 2006), and was akin to action learning (Revans, 1998; Kramer, 2008), appreciative inquiry (Cooperrider & Whitney, 2005), and Peters’ (2009) DATA-DATA. Within these processes the university personnel and other participants were socio-cognitively constructing their worlds. And, the processes were embedded in triple helices of interactive learning with firms and government agencies. The research methodology that incorporates such multilevel processes is similar to intervention research as discussed by Rothman and Thomas (1994) and their contributors and to Jarvis’s (1999) practitioner-researcher, but in the context of community.

The fundamental issue for this research is how the researchers recognize that community and, more importantly, the input functions of community and how they result in increased capabilities. They subjectively experience community and recognize functions when pointed out to them. It is possible that, coming from various disciplines, the university personnel would dialog about their scholarly perspectives on learning. It is even possible that they would bring these together to consider learning at different levels. But it is rather less likely that, living inside their respective paradigms, they would develop a conceptual framework and theory of composition that would result in a comprehensive explanation such as “community results in learning.” The point being that without such a framework and theory in place the university personnel would likely have looked at GB, as researchers, in terms of the adoption and impacts. They would have started from the internet paradox and productivity paradox, possibly drawing on social constructionism, to prove that such lagging or poor effects are temporary artifacts of learning. But, in the end, they would have used a research approach much like described in conjunction with scenario one.
If, in contrast, the university personnel started from the fundamental proposition of this dissertation, that community makes people (and organizations and regions) smarter, they may take a different approach. A different research approach is even more likely if they accepted that the ultimate good is real freedoms, and recognized that it is immoral and impractical to treat individuals as means to an end (such as producing objective research results). This approach basically involves engaging others in creating and testing hypotheses about the relationship between community input functions and real freedoms.

The general hypothesis—which would have been developed with as part of the community-building process among university partners and Greenfield Regional Foundation (GRF) members—would be that community-building will result in the greatest capability gains from Greenfield Broadband (GB) at the least cost for individuals as persons, members of organizations, and residents of the region. For each individual the specific hypothesis is a bit different, as are the community input functions. This is because each individual’s interests at each level are different. While they all reside in the region, they interact in unique ways with the infrastructure and institutions. Some share organizational affiliations, but play a unique role as labor and with capital. And, each individual has unique personal ability and capacity. The process for creating and testing these hypotheses is the same—the community-building process of identification, integration, and differentiation—though these functions manifest somewhat differently for each individual.

Because the process has the same structure for each individual (as persons, organization members, and region citizens), the set of methods and tools used to support the process are the same. These methods and tools are developed and managed by the university partners. As they use the tools to identify, integrate, and differentiate, individuals generate data. The data are
primarily used to test practical hypotheses about the value of GB. For example, neighborhood teams use simple survey forms to gather information about interests, goals, concerns, etc., of their neighbors. They use data from these forms to organize house parties on various topics. Additional data are generated by participation in the parties, and that data is used to identify specific opportunities for individuals to realize benefits from or with GB. Individuals generate data about impacts as they act on these opportunities.

Each of these activities represents steps of community-building, increasing capabilities, and data generation for research. The university partners analyze the data to answers question such as, “Do those individuals who go through the most community-input functions realize the greatest gains in real freedoms?” The data gathered during GB activities are associated with demographic data, so the researchers can control for confounding factors, identify intermediate outputs (i.e., competencies), and isolate mediating influences. The data are used to specify the models, test the hypotheses, and validate and verify (falsify) the theory. The methods and tools for gathering data become part of the university personnel’s practice, as well as means for GB stakeholders to work through the community-building process. Thus, the methods and tools allow for feedback to and reflection by the university partners regarding their roles for evaluation and learning purposes.

Conclusion

What is the relationship between learning by individuals, organizations, and regions? It depends on how one defines learning. A central element of this theory is the definition of learning as a gain in capabilities, which equate to knowledge and real freedoms—liberty, prosperity, and wellness. In common language, capabilities are what one does, has, and says. The
relationship between micro, meso, and macro level learning is most strongly positive when community links the levels. And, learning is structurally the same—involving changes in visions and connections as well as behaviors at all levels—even though the learning takes a different form (persons, organizations, regions) and has different functions (fulfillment, performance, advantage).

The foundation of my proposed theory is that, while capabilities can be attributed to persons, organizations, and regions, morally we must only consider individuals as ends in and of themselves, and practically capabilities are only evident in individual behavior. Thus the unit of analysis is the individual human being, which can be analyzed at the personal, organizational, and regional levels. But each of these is a component of individual capabilities: Individual capabilities are a function of personal, organizational, and regional capabilities.

One way to understand the relationship between learning at different levels is to consider the metaphors that emerge from the literature: individual cognitive constructors (micro level) engaged with others in organizational loops of learning (meso level) embedded together in regional triple helices (macro level). This may be evocative, but it is not useful for explaining or predicting learning, why some persons, organizations, and regions learn better or faster than others.

But, before we can explain or predict or critique or improve, we must describe and measure capabilities in ways that valid and verifiable. The ordinary concept of capabilities as evident in what one does, has, and sees provides a starting point. In this dissertation I have provided a conceptual framework that I believe is a philosophically and scientifically sound version of such common wisdom. Behaviors, connections, and visions (B-C-V) are what we do, have, and say. B-C-V includes the intersubjective, objective, and subjective aspects of agents—
collective and individual—which provide the basis for valid description and measurement. B-C-V can be verified in terms of coherence, consistence, and correspondence. Behaviors are evident. They provide means for validly measuring the information and materials acquired via connections, and for verifiably describing the “sides” of visions (what is perceived as objectively beneficial and possible; subjectively desirable and practical; drivers and limiters; past and future).

Further, B-C-V can be described and measured as knoels (knowledge elements) linked in webs of meaning that appear as explicit, implicit, and tacit knowledge at each level. Each person, organization, and region has a unique B-C-V—the differences in B-C-V essential define the boundaries and characteristics of each level—and each individual’s capabilities are the product of associated B-C-V at all levels. Practically, B-C-V manifest as liberty, prosperity, and wellness, which are the product(s) of an individual’s personal, organizational, and regional capabilities.

In this dissertation I propose that learning can be explained and predicted by community. I propose that the input functions of community determine capabilities; that community makes people smarter. The optimal circumstances are when liberty, prosperity, and wellness are mutually reinforcing rather than trade offs. Such circumstances result from connecting learning across levels via community. When implemented in an inclusive yet purposive manner, the community input functions—identification, integration, and differentiation—set up real freedoms that feed into and reinforce each other. The community input functions align liberty, prosperity, and wellness via micro, meso, and macro level interactions. Community operates at micro, meso, and macro levels determine individual freedoms, and its effect is strongest when those functions align across levels. Positive actions on the community input functions—more extensive and
stronger identification, integration, and differentiation—result in great socioeconomic gains for the regions, organizations, and individual people who undertake those actions.

These concepts are synthesized from various academic disciplines—particularly philosophy and the behavioral-social sciences—to provide means for describing and measuring capabilities at various levels. These concepts do not explain the relationship between learning at each level—how capabilities gain at one level affects capabilities at another—or even explains differences in capabilities between individuals (within levels). The subjective validity of this theory comes from my personal and professional experience and from my studies. Greenfield is an amalgamation of my past clients. My experience is also the source of correspondence: This dissertation is partly an attempt to explain phenomena that I’ve personally experience.

The objective validity rests in the practical aspects of observing and predicting behavior (and connections and visions) covered by the theory. I believe this dissertation is a substantial contribution because it can be consistently applied at multiple levels and in many different contexts to describe and measure, and to explain and predict, learning. The consistency of my framework arises from its philosophical foundations, from building on components that appear in various areas of research and practice, and from integrating qualitative and quantitative approaches. My concepts and conjectures have a consistency that flows from the need to describe and measure in meaningful ways regardless of subject or topic. The concepts and conjectures have intersubjective validity because they are synthesized from multiple, disparate yet complementary, academic sources. While disciplinarians might take issue with how I associate and use certain concepts, such objections would overlook obvious gaps and parallels in the literature. The abutments for the proposed theory were in place but the bridges were missing. What I have attempted to do is provide a coherent explanation of the relationship between
learning at different levels, an explanation that can make sense of the diversity of established thoughts on these matters.

As noted in the introduction of this dissertation, Lakotos (1976, 1978) maintains that theory must be judged by its consistence with accepted knowledge, its heuristic value, and the novelty of its predictions. I believe I addressed the first issue via the validity and verifiability of my conjecture that communities increase capabilities across levels. The theory could provide heuristic value in practice and research. The practice of GB’s (Greenfield Broadband) university partners in the second scenario suggests how the concepts in this dissertation might apply in practice. The discussion of how each model might be applied, above, provides some guidance for research, and chapter four provides conceptual depth for extending and refining the theory.

Novel predictions, which were Lakotos’s criteria for true science, are more challenging. The general prediction, that those individuals with stronger community across levels will have the greatest capabilities, is somewhat novel. Community has been used in various conceptual forms in learning theory, particular at the organizational and regional levels. But my proposed theory conceives of community as a phenomenon or process—not a thing—that determines capabilities. I believe my proposed theory has other novel implications, particularly for the fuzzy space between paradigms, for how concepts from different disciplines fit together. The Greenfield thought experiment provides examples. The illustration of GB without community-learning is far from what would be expected under the “if you build it, they will come” paradigm. The predications of my proposed theory are somewhat novel simply because the concept of community-learning is novel. As the models are applied to various circumstances, I believe it will generate more novel predictions, along with valuable heuristics and intellectual consistency.
The Greenfield broadband thought experiment suggests some novel, albeit totally hypothetical, outcomes. In the first scenario the community input functions were weak, especially at the organizational and regional levels. Those who adopted Greenfield Broadband (GB) in scenario one, particularly those who were technology savvy, had negative vision of the region and its organizations. They did not see adequate resources for personal fulfillment. We know because of what they did: They used GB to search for things they personally valued—goods to purchase, educational activities, new jobs—outside the region. In the process, they shifted their time, money, and attention out of Greenfield. In scenario one, individuals increased their real freedoms by exiting the region, virtually if not actually. Those who used GB for organizational purposes ended up working more, shifting time away from personal purposes, and trading a bit of liberty and wellness for a modicum of prosperity. Individuals in organizational and regional roles did not adopt GB or capitalize on it to improve their divisions of labor or institutions.

These imagined results are quite a contrast to the “if you build it, they will come” presumption; it is more like, “if you build it, they will leave”! Of course, these are little more than predictions of what would happen in a situation like Greenfield’s, based on the theory that community yields learning. But, the imagined results of scenario one are consistent with empirical findings of research into adoption and use of information and communication technologies. And, the results in scenario one are quite reasonable and follow logically from the manner in which GB (Greenfield Broadband) was instigated.

Essentially, those who saw the potential value of broadband—those who, in terms of my conceptual framework, had a strong frontside and outside vision for it—adopted and used GB in ways that disconnected them from Greenfield. Those who had a strong belief in—vision for and
—their organizations and regional institutions did not adopt and use GB. It did not fit their visions. They did not change how they acquired information and materials for their organizations or the region, nor did they change what information and materials they had. Specifically, they didn’t buy more ICTs (information and communication technology), hire more technologists, or send their employees to ICT-related training. This illustrates how B-C-V (behaviors-connections-visions) can be used to describe and measure changes and impacts, as well as lack of learning between and within levels.

In the second scenario of this thought experiment, the Greenfield tractor scion and the university representatives identified each other during a conference, based on complementary visions, and integrated through follow-up meetings, changing their B-C-V. This led the universities to further identify with each other, drawing other university personnel, and integrate via their work on GB. They then became an identification mechanism to connect organizational and regional agents with each other and GB. As a result, the organizations shifted their capital and labor toward ICTs, and ICTs were incorporated into regional institutions. So, by the time GB was deployed and individuals began to adopt it, activities and assets of interest to them were available online from local organizations and regional institutions. Individuals in scenario two shifted fewer connections to non-local sources, or established weaker non-local connections that were more likely to draw capital into the region. Again, this is fictitious scenario, and the results are nothing more that predictions of what might happen in this situation if, as I propose, community-building results in gains in capabilities. While the circumstances push the limits of credulity, the imagined results are reasonable, do not contradict other theories or the conclusions of empirical research cited in this study, and can be described by my models and explained by the theory I suggest.
Taken together the two imaginary scenarios—summarized in table 6—illustrate the usefulness of my conceptual framework, and the potential power of my putative theory. The thought experiment also suggests opportunities for applying the content of this dissertation to research and practice. The general opportunity is to investigate the effects of the community input functions on real freedoms, how much variation in and relations between real freedoms can be explained by variation in community input function. One set of research opportunities involve validating the concepts I’ve laid out in this dissertation, including operationalizing the variables and establishing reliable means for describing and measuring them. Another set of opportunities involves testing the central propositions of this dissertation in various contexts, particularly the relationships between learning at various levels.

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<th>Scenario one: broadband deployment with weak community input functions</th>
<th>Scenario two: broadband deployment with strong community input functions</th>
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<tbody>
<tr>
<td>Macro</td>
<td>Identification</td>
<td>Integration</td>
</tr>
<tr>
<td>Meso</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Micro</td>
<td>None</td>
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The B-C-V and W7TH (how, that, what, when, where, who, why, whether, which) frameworks and the concepts of capabilities and community provide bases for carrying out these tasks, but these things need additional development for particular applications. Possibly the most
fundamental research opportunity is to validate these concepts in the B-C-V and W7TH frameworks in practice. These are little more than extensions of existing concepts from the behavioral and social sciences presented in an integrated and simplified manner, so they have prima facie validity. Further validation would need to come from application.

There are opportunities to examine how the community input functions feed into each other. Do these functions actually exist apart from factors of learning such as prior knowledge and practice? Community-learning is conceived to be a complex process with diverse interactions between its component functions. Can it be validly characterized as a process? I suggest that innate drives are evinced differently with each community input function. Is this true? If so, this could show that the functions are real and distinct parts of a process. How are the functions related to each other? Are they connected in a linear and sequential manner or are the relationships between functions more complex, and, if so, under what circumstances are they related in complex or simple ways? So, for example, I suggest that integration is driven by selfish intentions and motivations, but those motives change with differentiation as personal drives are fulfilled. At that point individuals will act on behalf of the community and even sacrifice for it based on the extent to which their role in the group is part of their identity.

There are similar opportunities to better understand real freedoms—liberty, prosperity, and wellness—and relations between them. Are these valid concepts? Can they be complementary or are they necessarily mutually exclusive? The strength of interaction effects between real freedoms could be considered a dependent variable in studies of multilevel learning, but such research would almost have to be preceded by research that establishes the constructs and identifies these interaction effects.
Of course, the central question of this dissertation is the relationship between individual, organizational, and regional learning. My proposed answer is that community input functions not only explain learning at one level but also relations between levels. This is a novel proposition. It also presents something of a research challenge becomes in requires micro, meso, and macro level, and of both the community input functions and the capabilities or real freedoms. To make matters worse, such research might also involve assessing learning factors to control for confounding factors and assessing competencies to identify short-term results. So, for example, based on my theoretical propositions, a researcher might hypothesize that the more diverse the parties involve in identification are, the greater potential and actual knowledge gains will be. Or it might be hypothesized that community input functions that involve individuals acting in personal, organizational, and regional roles, so the functions operate at the micro, meso, and macro levels, will have the greatest outputs. These are both novel predictions, particularly the latter, and have important practical implications.

The simple way to investigate community-learning is likely to be to study the functions at one level in a particular context. Such studies could afford consideration of spillover effects to other levels, especially if the study is designed to accommodate such analysis. Another approach might be to have multiple, parallel studies of learning at different levels by scholars in different disciplines coordinating their work to examine cross-level effects. Of course, ideally studies could focus on relationships between learning at different levels. It would be interesting to examine how changes in personal abilities, division of labor and technology, and institutions—micro, meso, and macro level phenomena—interact and relate. The discussion of Greenfield broadband suggests how this might be practically accomplished by focusing on particular activities or projects. A multilevel learning research agenda, though, would almost have to start
with validation of essential concepts, developing methods for describing and measuring them, and then turn to examining relationships between the constructs.

I suggest that the unit of analysis for learning research must be the individual human being, for philosophical and practical reasons. But, the most opportunities for further work with this theory may be in organizational performance. This is simply because regional development is a larger-scale phenomenon, and less open to new practices, and because individual education and personal development are too politically charged. Organizations have strong need for greater capabilities, and scholars in management and social sciences are attuned to factors that impact organizational performance. That said my proposed multilevel theory of learning could have novel value in understanding and improving school performance and accelerating economic development. Innovation and technology are two topics that present abundant opportunities for further research, as suggested by the discussion, above.

This dissertation has provided a textual analysis of theories of learning and identifying commonalities and differences across these bodies of literatures. It describes clear gaps between bodies of literature on individual, organizational, and regional learning. On one hand, the literature does not provide a conceptual framework for learning that could apply at macro, meso, and micro levels. On the other hand, there is scant consideration of how learning at these various levels relates. I have applied theory- and model-building methods to suggest ways to address these gaps. I have also illustrated how my concepts and models might be applied. It is my sincere hope that this dissertation provides practical bases for investigating community-learning, and can contribute to learning practices as well as scholarly endeavors.
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