

THESIS

SUSTAINABLE CHANGE: KNOWLEDGE ABSORPTION AS A FACTOR OF
ABSORPTIVE CAPACITY THEORY AMONG GREEN INDUSTRY
CONSULTANTS

Submitted by

Sarah Badding

Department of Design and Merchandising

In partial fulfillment of the requirements

For the degree of Master of Science

Colorado State University

Fort Collins, Colorado

Summer 2011

Master's Committee:

Advisor: Ajoy K. Sarkar

Co-Advisor: Katharine E. Leigh

Donald L. Venneberg

Copyright by Sarah B. Badding 2011

All Rights Reserved

ABSTRACT

SUSTAINABLE CHANGE: KNOWLEDGE ABSORPTION AS A FACTOR OF ABSORPTIVE CAPACITY THEORY AMONG GREEN INDUSTRY CONSULTANTS

Researchers and practitioners have been interested in organizational learning as a means to improve performance (Gilley, Dean, & Bierema, 2001; Senge, 1990). The diversity of individuals comprising the context of an organization requires response to change to continue competitive organizational development. When influences and triggers pressure an organization to change, a niche is created for the external consultant. Consultants assist organizations to become more conscious of their own capabilities to successfully address, acknowledge, and use knowledge from internal and external environments. The purpose of this study is to assess the use of knowledge types identified within ACAP theory by consultants guiding clients on a path toward sustainable change. This study enhances existing research regarding absorptive capacity by looking for evidence of new knowledge through the lens of sustainable change. The research goal is to ascertain the active use of key factors of knowledge absorption by green consultants.

Findings of this study support a relationship among the consultant's role and the client's capabilities. Utilizing sustainable change strategies and the consultant's complex set of skills the consultant works with a client exhibiting existing strategies supportive of sustainable change. Determining the types of knowledge already present within the organization, green consultant's focus on a customized approach offered through tactics for sustainable change to achieve organizational objectives creating lasting and sustainable change.

ACKNOWLEDGEMENTS

I would like to express my deepest appreciate to my advisers: Ajoy K. Sarkar and Katharine E. Leigh. Both have always been encouraging and understanding, and without their dedication and hard work, this thesis would not be possible. Ajoy, you have always been a major influence in my life, and it only seems fitting that you would help me accomplish one of my largest tasks to date. I could not have imagined going through this journey with anyone but you. Katharine, you truly are an inspiring woman and a true friend. Your guidance and encouragement has led me down a path that has allowed me to complete, what at moments, has seemed impossible. Words cannot describe how thankful I am for your devotion to my success.

I would also like to extend sincere appreciation to my outside committee member, Donald L. Venneberg, always encouraging and insightful. It has been a pleasure to work with you throughout this experience and I am excited to start my next adventure with your guidance and support.

To Dr. Theodore Chamberlain, you are my mentor, and the reason why I am here writing this today. When I first met you seven years ago, I could not have dreamt of the opportunities and life lessons you would provide me with. You have changed the way I

view the world, and have taught me the importance of being polite; the significance of a cup of coffee; and the secret to a blessed and fulfilling life through a water buffalo named Rama.

Lastly, I would like to express all my affection to Tucker. You have been my outlet of happiness and laughter since the day I met you, and have ultimately taught me the power of love and compassion.

DEDICATION

This thesis is dedicated to “my Mother, my Father, Brothers and Sisters, my dear companions and dearest friends - how beautiful they blossomed in the springtime of my life..”

T. Chamberlain, 2010

TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iv
DEDICATION.....	vi
TABLE OF CONTENTS.....	vii
LIST OF TABLES.....	x
LIST OF FIGURES.....	xi
CHAPTER I.....	1
INTRODUCTION.....	1
Purpose of the Study.....	3
Assumptions.....	5
Terms and Definitions.....	6
Perspective of the Researcher.....	9
Delimitations.....	10
CHAPTER II.....	11
LITERATURE REVIEW.....	11
Environmental Thinking.....	13
Enhancing the Product Development System.....	14
Incorporating Eco-design.....	16
Life-Cycle Assessment.....	17
The Effects of Cost.....	18
Approaches to Performance and Change.....	20
Lewin’s Model of Organizational Change.....	20
Mager and Pipe Model.....	21

Human Performance Technology Model (HPT).....	22
Gilley et al.'s (2001) Model for Managing Change Processes	23
Complex Adaptive Systems (CAS) Model for Organizational Change ...	24
The Consulting Role in Organizational Change	25
Absorptive Capacity (ACAP)	26
Knowledge Absorption	29
Primary Knowledge Characteristics	32
Organizational Structure	34
Inter-Organizational Scope	35
Role of Consultants as Change Agents	37
Knowledge Acquisition to Achieve Sustainable Change	37
Conceptual Framework	38
CHAPTER III	40
RESEARCH DESIGN AND METHODOLOGY.....	40
Population and Sampling Frame	40
Instruments and Measures.....	42
e-Survey	43
Reliability in Quantitative Research	46
Validity in Quantitative Research	46
Reliability in Qualitative Research	47
Validity in Qualitative Research.....	47
Approach to Data Collection	48
Data Analysis	48
Data Collection	50
CHAPTER IV	52
DATA ANALYSIS AND FINDINGS.....	52
Sampling Frame	53
Summary	55
Participant Profile	56
Gender.....	56
Years with a Firm.....	56
Years in Full Time Practice	57
Education	58
Typical Clientele and Change.....	58

Analysis of Responses	59
Research Question [1]: Role of the Green Consultant.....	60
Research Question [2]: Measures Employed by Consultants	61
Research Question [3]: Absorptive Capacity in Practice.....	63
Research Question [4]: Factors of knowledge absorption	66
Results.....	71
Consultant and Client Relationship	71
Consultant Skills	72
Tactics	73
Client Mentoring.....	74
Conceptual Model.....	75
CHAPTER V	77
DISCUSSION AND CONCLUSIONS.....	77
Research Question [1].....	78
Research Question [2].....	78
Research Question [3].....	79
Research Question [4].....	79
Study Summary.....	80
Recommendations for Future Studies.....	82
Study Limitations.....	83
Implications.....	83
REFERENCES	85
APPENDICES	89
APPENDIX A: PHONE SCRIPT	90
APPENDIX B: E-SURVEY.....	92
APPENDIX C: IRB PROTOCOL LETTER.....	98
APPENDIX D: PARTICIPANT CONTACT LIST.....	100

LIST OF TABLES

Table 1.	Characteristics of Absorptive Capacity, Organizational Learning, and Intra-Organizational Scope	4
Table 2.	Approaches to Performance and Change in Models Employed by consultants.....	26
Table 3.	Study Variables	49
Table 4.	Emerging Themes and Patterns: Strategies, Tactics, and Reasons to Engage	50
Table 5.	Tactics to Acquire Knowledge: Valued Importance by Green Consultants.....	66
Table 6.	Tactics for Sustainable Change.....	75

LIST OF FIGURES

Figure 1.	Study Components Potentially Contributing to Absorptive Capacity	5
Figure 2.	Conceptual Framework Model (Badding, 2010)	39
Figure 3.	Week-by-Week Contact Results for Original Participant List	54
Figure 4.	Week-by-Week Contact Results for Reference Participant List.....	55
Figure 5.	Gender of Respondents Completing Survey.....	56
Figure 6.	Respondents' Years Completed with Current Firm.....	57
Figure 7.	Respondents' Years in Full-Time Practice	57
Figure 8.	Reported Degree Type of Respondents Who Completed Survey.....	58
Figure 9.	Component Diagram for Sustainable Change Strategies.....	72
Figure 10.	Component Diagram for Consultant's Skills.....	73
Figure 11.	Sustainable Change Performance Model (Badding, 2011).....	76

CHAPTER I

INTRODUCTION

“Change does not take place in organizations without someone recognizing the potential for improvements” Jones & Craven, 2001

Researchers and practitioners have been interested in organizational learning as a means to improve performance (Gilley, Dean, & Bierema, 2001; Senge, 1990) with learning applicable in academic and organizational settings. The theoretical foundation for organizational learning can be located within traditional theories of adult learning: liberal arts adult education, progressive adult education, behaviorist adult education, humanistic adult education and radical adult education (Gilley, Dean, & Bierema, 2001). Each of these education theories focuses on the development of the individual with methodological and practice differences: critical reflection (Dewey, 1933); continuous learning (Senge, 1990); action learning (Revans, 1982); and transformative learning (Mezirow, 2000). The diversity of individuals comprising the context of an organization requires response to change from internal and external influences to continue competitive organizational development. When external influences and internal triggers pressure an organization to change ways they seek success in the global marketplace, a niche is

created for the external consultant. Consultants assist organizations to become more conscious of their own capabilities to successfully address acknowledge and use knowledge from internal and external environments.

Organizational consultants have implemented training as the intervention of choice to change behaviors in the workplace. “One’s assumptions affect the beliefs, policies, principles, and practices adopted, and so influence one’s actions and behaviors (Gilley et al., 2001). More recently, the focus of organizational learning has been on *learning solutions* redirecting the emphasis away from short-term needs and toward building individual capacities to *learn how to learn* in organizations.

Sustainability as a major, driving force in the global marketplace has created new needs for organizational learning requiring change; the role of the “green consultant” is in response to the need of organizations to employ external resources to assist in meeting organizational objectives aimed at sustainable transitions. The change might be as small as the development of a recycling plan, or large, as in transforming the ways an organization incorporates sustainability in product development. This research study seeks to understand ways in which green consultants work with client organizations, and the factors and approaches used in creating transformative change for their clients.

Cohen and Levinthal (1990) suggested the ability to absorb new knowledge is a critical component in organizational transformation with significant benefits to performance and organizational growth (Jansen, Van Den Bosch, & Volberda, 2005). They conceptualized a theoretical premise regarding an organization’s absorptive capacity (ACAP) as the ability of organizations to absorb new knowledge from internal and external sources. This model was created to envision the economic impact of

knowledge related to performance and has not been used to assess organizational transitions to achieve sustainable change; however, as a framework to evaluate the type of information employed by green consultants, ACAP provides an organizing structure to this inquiry. Dominant constructs in ACAP theory include knowledge absorption, organizational learning, and intra-organizational scope, with diverse factors attributable to each construct. Table 1 identifies these constructs and related factors. Interests underpinning this research investigation lie in the realm of knowledge absorption as crucial to organizational change. This construct must be in place to further examine factors of organizational learning and intra-organizational scope (Table 1). This study explores ACAP's (Cohen & Levinthal, 1990) knowledge absorption construct in the work of green consultants to ascertain evidence of and value of knowledge types in their consulting role. Scarce research exists on factors of knowledge absorption as most salient and productive to the objectives of consultants working toward organizational transformation to achieve sustainable change.

Purpose of the Study

The purpose of this study is to assess the use of knowledge types identified within ACAP theory by consultants guiding clients on a path toward sustainable change. This study enhances existing research regarding absorptive capacity by looking for evidence of new knowledge through the lens of sustainable change. Four research questions form the foundation for this inquiry:

Q1: What is the role of green consultants in aiding organizations to embrace sustainable practices?

- Q2: What measures are employed by green consultants in transitioning client organizations toward sustainable practices?
- Q3: Is absorptive capacity used as a model for change, specifically in the work of green consultants?
- Q4: What factors of knowledge absorption reinforce sustainable change?

Table 1.
Characteristics of Absorptive Capacity, Organizational Learning, and Intra-Organizational Scope

Constructs		
A.	B	C.
Knowledge Absorption	Organizational Learning	Intra-Organizational Scope
Key factors	Key factors	Key factors
a. Kinds of knowledge: prior knowledge tacit knowledge explicit knowledge knowledge integration	a. Resistance b. Diversity of Knowledge c. Boundary Creation gate keepers & boundary spanners experience of employees job rotation	a. External contact types b. Alliance partners learning strategic c. Change agents d. Transparency internal external
b. Means of transfer difficulty	d. Routines formal informal	
c. Knowledge opportunity R&D investment innovation approaches technological opportunities disruptive technology opportunities	e. Internal Relationships common meanings & language sharing capabilities formal meetings & gatherings	
d. Activation triggers for change	f. Organizational Structure organizational structure type (hierarchal environment, flat, organic) cross function distribution of mechanism	
e. Problem-solving skills		

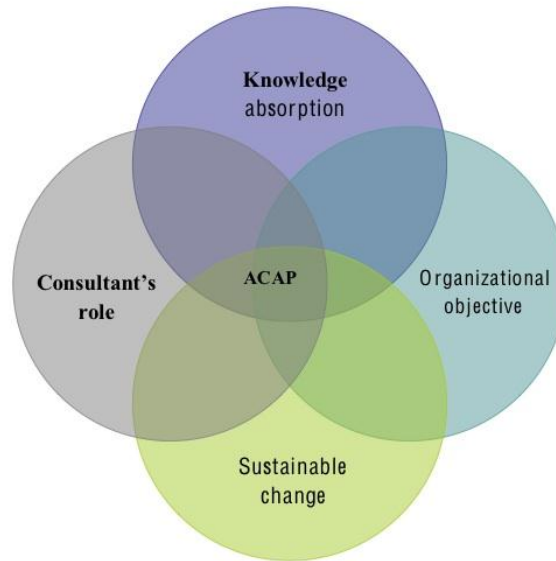


Figure 1. Study components potentially contributing to absorptive capacity

Knowledge absorption serves as the foundation for ACAP; without an organization's motivation to actively seek new knowledge, organizations cannot learn and therefore will fail to thrive. Past research studies (Cohen & Levinthal, 1990; Zahara & George, 2002) found when organizations increase methods for and the efficiency of acquiring, learning, and utilizing new knowledge, significant impacts affect competitive advantage, the rate at which new products are produced, the rate at which new technologies are discovered, and productivity through learning (Cohen & Levinthal, 1990; Zahara & George, 2002). The research goal is to ascertain the active use of key factors of knowledge absorption by green consultants.

Assumptions

An innate assumption was green consultants would be passionate about working toward sustainable change for their clients, with focused and concentrated efforts employing factors measuring knowledge acquisition. A consulting approach

encompassing measures of knowledge acquisition would be indication of the presence of one construct of ACAP. Knowledge acquisition is an important factor in creating organizational change and measuring performance. The interest level of potential participants should reflect a vested interest in a study identifying specific measures of effective performance (i.e., ACAP). Findings may invite and encourage green consultants to look at new strategies as well as re-think existing ones, currently employed in their practices.

Terms and Definitions

The following terms and definitions frame the investigation:

absorptive capacity (ACAP): a set of organizational routines and processes used by organizations to acquire new knowledge producing dynamic organizational capabilities. Four organizational capabilities - knowledge acquisition, assimilation, transformation, and exploitation- build upon each other to yield cohesive dynamic capabilities within an organization (Zahara & George, 2002, p. 186).

change agent: “The individual for facilitating the change [whose]... success ... [is dependent upon their] ability to identify and diagnose potential problems, develop appropriate change interventions, execute them effectively, and evaluate their impact on the organization” (Gilley & Maycunich, 2000, p. 297)

disruptive technology: “technologically straightforward...off-the-shelf components put together in a product ... often simpler than prior approaches... [offering] less of what customers in established markets wanted..[and] rarely...initially employed there. [But] offered [as] a different package of attributes valued only in emerging markets”... (Christensen, 1997, p. 15). In the arena of sustainability, knowledge can be seen as a ‘disruptive technology’; a new way of doing something overturning an organization’s traditional methods and practices.

efficiency factor: value from an organization’s knowledge base attributed to variation in their capability to transform and exploit knowledge.

environmental sustainability: the maintenance and regulation of balance between renewable and nonrenewable resources in both natural and biological environments while at the same time minimizing human pollution and waste.

experience level: of employees within the organization, or the experience level of the consultant. Different levels of experience can help “(1) to develop highly complex cognitive skills such as decision making, evaluating, and synthesizing; (2) to positively impact the learners’ values, beliefs, or attitudes; (3) to induce empathy (understanding); (4) to sharpen interpersonal communication skills; and (5) to unlearn negative attitudes or behaviors” (Kolb 1984; Thiagarajan 1980, p. 30) as cited in (Gilley & Maycunich, 2000, p. 128).

explicit knowledge: expressed through words and documented knowledge (*i.e.* numbers, codes *etc.*) To be communicated, stored, and distributed among employees.

external contacts: agents or stakeholders outside the organization providing valuable knowledge to those inside an organization supporting successful integration of new knowledge.

external activation triggers: Radical innovations, technological shifts, changes in policy, etc. moderating the impact of knowledge sources and experience on absorptive capacity developments (Zahara & George, 2002)

external knowledge: knowledge sources outside of the organization; the easier to learn from the outside source, the easier to capitalize on technological opportunities (Cohen & Levinthal, 1989, 1990).

gate keepers/boundary spanners: Members within the organization who either formally or informally collect, evaluate and disseminate difficult to understand information to internal members, linking organization members to the learning environment (Jones & Craven, 2001; Zahara & George, 2002).

green consulting/green consultant: consulting/consultant services to organizations seeking change - embracing the way in which they develop, produce or deliver services or products aligned with lessening the impact of energy and resources; decreasing the organization’s carbon footprint; lessening the depletion of resources; orienting an organization’s practices toward cradle to cradle systems.

innovation: “the process of bringing new problem-solving or value-adding ideas into use” (Gilley & Maycunich, 2000, p. 360); Van de Ven and Angle (as cited in McLean, 2005) defined innovation as “a process of developing and implementing a new idea” (p. 12).

internal activation triggers: moderate the impact of knowledge sources and experience on absorptive capacity developments (*i.e.*, organizational crises, performance failure, Zahara & George, 2002).

knowledge integration: An assimilation process establishing a view of the organization built upon alliances between organizational members implying stability, affiliation, and social relationships (Grant, 1996) aided by shared norms and values.

knowledge transfer: Culture based, can be broken down into distinct stages. We've chosen five steps to describe the process: idea creation, sharing, evaluation, dissemination, and adoption (Levine & Gilbert, 1999).

organizational learning: information generated through direct experience of employees, and then shared, interpreted collectively [and internalized] throughout the organization (Easterby-Smith, 1997).

organizational structure: A framework of identifiable elements aimed at creating organization stability with variability of scope, flexibility, and efficiency of knowledge assimilation (Lane, Koka, & Pathak, 2002); also characterized as chain of authority in organizations.

potential knowledge: a firm's receptivity to acquiring and assimilating external knowledge (Zahara & George, 2002).

power roles: political and/or economic influences, affecting the support or lack of compliance for proposed change throughout an organization (Burke, 2008).

prior knowledge: Knowledge that exists or is possessed by the organization or its members represented by the organizations ability to recognize the value of prior information, then assimilate and apply to commercial ends (Cohen & Levinthal, 1990) create the value of this knowledge type.

realized knowledge: a firm's ability to transform and exploit knowledge absorbed (Zahara & George, 2002).

social integration: establishment of interpersonal relationships facilitating sharing and subsequent exploitation of knowledge in the organization. (Zahara & George, 2002)

strategic alliance: Agreement among two or more organizations to work together toward common objectives involving higher levels of knowledge exchange and technology transfer among the partners (Mowery, Oxley, & Silverman, 1996).

sustainable change: "At the global level, sustainable [change] is oriented towards solutions that do not doom developing countries to a permanently secondary place in the world economy under the rubric of 'environmental protection'" (Edwards,

2005, p. 21). Change towards sustainability “can become firmly established within the existing value structure of societies while simultaneously helping that value structure evolve toward a more long-term approach to systemic global problems” (p. 23)

tacit knowledge: Resides within people, as unwritten knowledge acquired through experience; can only be communicated informally or through example ((Easterby-Smith, 1997). This type of knowledge is communicated best through shared norms and values.

technological opportunities: Opportunities to enhance industry knowledge through the relevance of science and extra-industry sources of knowledge (Cohen & Levinthal, 1989).

Perspective of the Researcher

As a 24 year-old Caucasian female born and raised in Colorado with a bachelor’s degree in Design and Merchandising from Colorado State University in Fort Collins, Colorado, I have a perspective on sustainability. I have worked in the clothing design industry for over three years, with an appreciation of environmental awareness derived from external sources including the media and manufacturing suppliers, overseas and domestically. These sources have depicted the seriousness of environmental accountability.

I have witnessed the progress an organization can make toward sustainable change and environmentally conscious choices in my industry experience and maintain an active bias toward positive sustainable change in the clothing and design industries. I am dedicated to providing industry with ways to improve, enhance, and expand sustainability in practice. Through research focused on the roles of consultants in helping client organizations acquire new ideas and knowledge supporting sustainable transformation, I believe I can make professional contributions to the body of knowledge strengthening what is known about benefits of absorptive capacity integrated with the

role of “green” consultants. Finally, my research may identify important ways of capturing organizational learning and knowledge acquisition for consultants.

Delimitations

The study examines the role of consultants self-identified as engaging in transformative change for client organizations seeking sustainability. Consultants were identified from a listing of consulting firms participating in green consulting drawn from the list of resources in *The Sustainability Revolution: Portrait of a Paradigm Shift* (Edwards, 2005), followed by internet searches of consulting directories cross-referencing consulting resources with sustainable foci. Service descriptions were read for each organization identified as engaged in “sustainability” to ascertain participation in sustainable consulting. Over fifty factors have been identified by past researchers as influencing and measuring absorptive capacity. This study limits the scope of inquiry to one factor, knowledge absorption, as the foundation for ACAP’s presence and utilization by a consultant with focus on discovery of the consultant’s role, approach, tools and methods used in working with their clients to institute change. Organizational learning and intraorganizational scope, while important, were excluded from the focus of this exploration.

An examination of the relationship between consultant and client was also excluded from the scope of the study; the study does not seek to understand methods and procedures used by client organizations in locating new sources of knowledge focused on sustainable change, to examine organizational utilization of knowledge acquisition, or to understand how organizations apply knowledge for profitable outcome.

CHAPTER II

LITERATURE REVIEW

Organizational learning was initiated with development of the workplace in the 1700's (Gilley et al., 2001, p. 41) and continues to be a primary consideration for organizational growth. To meet challenges in the global marketplace, characterized by rapid change and transformation, organizations rely on their capacity to learn to stay ahead of the curve (Senge, 1990). Three developments in organizational learning affect the ability of organizations to embrace change. The first, "learning in the workplace ...[has] shift[ed] from formalized, short-term instruction [training] by an expert to informal, strategically focused learning facilitated by stakeholders and internal employees" (Gilley et al., 2001, p. 41). Second, the roles and services of external experts have shifted to embrace facilitating change. Third, "learning is becoming more closely linked with organizational strategy" (p. 42).

Organizational characteristics affect new and old working routines; routines can be positive and negative when an organization must seek change. Routines within an organization encourage the dissemination of new knowledge and formation of rituals facilitating knowledge creation through information-sharing and increases in social interactions and use of common language within the organization (Dyer & Singh, 1998;

Jones, 2006; Jones & Craven, 2001). “Knowledge and ideas are shared and common meanings...developed through [the] interactions” of employees within the organization (Tsai, 2001 p. 1003). Communication among employees improves upon new ideas helping create new visions. Encouraging employees to utilize their own unique language is one of the easiest and most cost effective ways for an organization to turn difficult-to-apprehend ideas into easy-to-understand concepts (Cohen & Levinthal, 1990; Jones & Craven, 2001).

Internal relationships and knowledge transfer manifested in organizations through use of meetings and gatherings. When an organization endorses use of formal and informal meetings, knowledge is inadvertently shared through informal side conversation as well as through traditional formal meetings (Easterby-Smith, Graça, Antonacopoulous, & Ferdinand, 2008). As formal and informal meetings occur, valuable know-how is transferred across organizational boundaries. In addition, groups within the firm begin to acquire knowledge of who knows what and where critical expertise resides within the organization; essential when working to incorporate new knowledge and establishing network connections, share prior knowledge, and identify external contacts (Dyer & Singh, 1998; Jones & Craven, 2001).

A main component to organizational learning is the links to individuals, taking shape through diverse roles. Power roles can be deterrents to organizational learning if it is not supported throughout the entire organization. Gatekeepers and boundary spanners can be utilized to help assimilate new and potentially difficult-to-understand information into the organization more easily (Cohen & Levinthal, 1990; Easterby-Smith, et al., 2008; Jones, 2006; Jones & Craven, 2001; Van den Bosch, et al., 1999). Multiple boundary

spanners or gatekeepers can exist across an organization supporting change. These individuals understand formal and informal links within their sector of the organization and how information might be transferred (Easterby-Smith et al., 2008; Jones & Craven, 2001). They use a variety of tools to ascertain their success in influencing other members of the organization including using language exclusive to group of members and distinctive mental maps and time frames best known to organizational constituencies.

There are those in organizations resistant to change of any magnitude; these individuals promote an environment of stability inhibiting and blocking change. Inhibitors to change are however, an inevitable part of introducing change, and invite the need for external change agents to facilitate an environment's readiness for change. External consultants fill a need for external change agents by serving as a skilled resource for change management planning.

Environmental Thinking

Sustainable practices have become a talisman for ethical responsibility toward our environment. Organizations seeking to increase competitiveness in a global market and embracing ethical positions to meet demands of external influences (stakeholders, consumers, legislation) are embracing a variety of strategic objectives focused on sustainability (Edwards, 2005). Whether attention to product development manufacturing processes, recycling materials in a cradle to cradle approach (McDonough & Braungart, 2002), or using alternative green energy sources for their facilities (Esty & Winston, 2009), organizations are striving to achieve a more balanced position with regard to sustainability.

Firms ignoring environmental responsibility could find themselves at risk; beyond profit, ignorance could cost them survival (Anderson & Cunningham, 1972). Altering an organization's current operations by incorporating environmental thinking increases efficiencies affecting internal and external perceptions of decreasing environmental impacts. Although organizations have been successful in various aspects of environmental practice, manufacturing and service industries have yet to find a way to bring these ideals into mainstream operations benefitting a majority of organizations. A steady increase in books and journals focused on enhancing an organization's environmental strategy (e.g., Estes, 2009; Esty & Winston, 2009; McDonough & Braungart, 2002) indicates increased interests in organizational sustainability. Strategies to increase sustainability include changes to product development systems, incorporating eco-design measures, life-cycle assessment, and cost implications in *going green*.

Enhancing the Product Development System

When an organization chooses to take steps towards becoming more environmentally friendly, appropriate strategies and tools are required to successfully alter the product development system. Traditionally, an organization's previous experience and knowledge led through the typical product development system. However, when a company chooses to become more environmentally aware and responsive, a series of key changes must take place. Experts are needed to acknowledge and integrate new environmental knowledge and the ways in which new practices can be implemented into design and performance objectives. Increased knowledge helps organization to learn-through understanding, exploration, defining, and implementing sustainability into product development actions (Luttrupp & Lagerstedt, 2006; Waage,

2007) and allows organizations to effectively address existing problems within their product development cycle.

Once an organization is able to assess existing knowledge and experience levels, the next step to enhance product development systems lies in evaluation of environmental performance of the product or service processes. Product performance and development speed need to be intertwined with environmental requirements (Kaebernick, Kara, & Sun, 2003; Waage, 2007) followed by determining unique product specifications. The use of non-toxic chemicals, distinctive features offered only by environmentally friendly products, or investment in safer and healthier materials create products with consumer advantages (Kaebernick, Kara, & Sun, 2003; Waage, 2007). Similarly, organizations offering *service* as product or outcome would also evaluate processes and impacts to the environment of transportation and products used in delivering services.

The final objective is achievement of enhanced management systems responsive to energy and resource conservation and cradle to cradle thinking. In-depth stakeholder analysis, encompassing of those fiscal accountability, is necessary to create a supportive organizational culture appreciative of measures required to achieve sustainable objectives. Taking time to speak with and learn more about stakeholder biases, personal goals and network alliances, and organizational aspirations informs consultants seeking to transform organizational operations. Determining policies to emphasizing accountability of change processes allows an organization's managerial system to become increasingly aware of those who are and are not following through on company goals and objectives in seeking sustainable practices (Mohr, Webb, & Harris, 2001).

Incorporating Eco-design

Creating opportunities for suppliers to take part in developing environmentally safer products, creating a market for the socially conscious consumer, and investing in their overall social well-being characterizes *eco-design*. Investment in eco-design resonates throughout an organization's goodwill and ultimately is reflected in the bottom line through profitability (Esty & Winston, 2009).

Front runners in eco-design include Volvo, the Swedish car company known for enhancing quality and safety of their products through environmental awareness (Luttropp & Lagerstedt, 2006) and British Marine Industries. BMI has found a way to incorporate eco-design in electrical components on boats; other organizations have incorporated the use of eco-design tools to build business machinery ideal for disassembly and recycling (Luttropp & Lagerstedt, 2006). These organizational examples demonstrate how eco-design approaches focus on certain product components or process phases to achieve sustainable results.

Implementing eco-design into environmentally focused practices invites increased revenue, imperative to the survival of organizations seeking financial growth. Finding a way to access benefits from eco-design strategies drives revenue growth in three ways.

Eco-design can:

- satisfy needs of consumers from functional, ethical and environmentally improved perspectives;
- fulfill the need of the industry to decreasing environmental impact; and
- maintain and control costs of services and products (Esty & Winston, 2009; Luttropp & Lagerstedt, 2006).

Life-Cycle Assessment

Life-cycle assessment of products allows organizations to monitor environmental impacts of their products from acquisition through manufacturing and distribution, and consider use and end-life of the product (Anatas & Zimmerman, 2003; McDonough & Braungart, 2002). Life-cycle assessment provides organizations with tools to understand issues and appropriate tools required to create competitive advantage (Esty & Winston, 2009). This may also be true considering service impact, by examining actions using a life-cycle perspective.

The marketplace is seeing a push for organizations to “close the loop” in the design process to create a cradle to cradle approach which considers end use of product materials (Esty & Winston, 2009; McDonough et al., 2003; McDonough & Braungart, 2002). Life cycle assessment is comprised of the product’s beginning stages and considers the use of environmentally friendly materials (i.e., 100% organic, post-consumer, recycled content) but is devalued when fabrication using hazardous, nonrenewable substances; a negative environmental impact has been moved along the life cycle without abatement or elimination of negative sustainable impact (Anatas & Zimmerman, 2003).

McDonough and Braungart (2002; McDonough et al., 2003) suggested a solution to product life cycle challenges - resolution through biological and technical cycles. The biological cycle of a product considers for example, biological nutrients found in textiles or packaging; natural fibers and nutrients in the product would ultimately be used to restore soil nutrients as the product degrades. On the other hand, technical cycles producing carpets and synthetic fibers would be de/repolymerized creating a product life

lasting through generations (McDonough et al., 2003; McDonough & Braungart, 2002) reinforcing the need for end-of-life options and recycling options. A product has primary impact during material and usage phases requiring the need for strong environmental assessment at this juncture (Kaebernick, Kara, & Sun, 2003). While a concrete methodology has yet to be pinpointed, McDonough et al., (2003) conceptualized as they call “The 12 Principles of Green Engineering” to help organizations create more sustainably conscious products and better product life cycle assessment (McDonough, et al., 2003).

The Effects of Cost

Going green has been considered more costly. On average organic cotton products were 60 cents more per yard for the consumer (Myers & Stolton, 1999) creating challenges for organizations trying to improve their product by electing to use organic cotton as they attempted to grow through expansion of their market for cotton products. Cost is a dual concept within organizations demanding balance between environmental cost and profit margins (Luttrupp & Lagerstedt, 2006). No matter how complex cost becomes, it is key in weighing successes and failures of incorporating environmental sustainability into practice.

It is important for organizations integrating environmental thinking to understand the ramifications of cost. Exploring existing markets cost less financially with a lower risk of failure than exploring new market potentials (Waage, 2007). If an organization is able to work in a market segment in which they already have experience, the organization is more likely to succeed in spending less on marketing and more on product development. Organization spend roughly 70% of their budgets on product development

(Waage, 2007), making it critical to have a clear understanding of the market's potential to provide future revenues. Past organizational experience can improve chances of the organization to succeed (Waage, 2007). Organizations often employ services of external consultants to identifying strategies to lower environmental cost while simultaneously increasing profit capabilities (Luttrupp & Lagerstedt, 2006). Organizations, and consumers search for products demonstrating high level functionality and accountability, with low levels of environmental and product costs (Luttrupp & Lagerstedt, 2006).

Examples of this high/low paradigm are embedded throughout history of sustainable industry change. Ray Anderson, founder and chairman of Interface Global, one of the world's largest sustainable manufacturers of modular carpet claims what saved his company was a \$300 million investment in cost reductions created through waste management and eco-efficiency (Esty & Winston, 2009; Interface Global, 2008). DuPont, a leading company in pioneering sustainable solutions essential to a better, safer, healthier life for people around the world made a commitment to slash both emissions and cost, with estimated savings over the past decade at roughly \$1.6 billion a year since making the effort to become environmentally sustainable (DuPont, 2009; Esty & Winston, 2009). DuPont annually nets roughly \$2 billion annually in cost savings; if efforts toward environmental sustainability were not taken, the organization would have reached a break-even point failing to thrive (Esty & Winston, 2009). When an organization chooses to take steps towards becoming more environmentally friendly, appropriate strategies, tools and resources are required to successfully alter the organization's learning processes to smooth the transition and acquisition of new knowledge. When the need to change is not recognized or acted upon successfully by

internal organization members, the stage is set for external change agents to meet environmental, social and economic concerns of the organization in achieving sustainable transformations in their practices.

Approaches to Performance and Change

Organizations are in a constant state of change, driven by several economic triggers; (e.g. cost, competition, market share, and technology). When an organization acknowledges a need for change, consultants introduced into the environment have the potential, with effective tools, to create fluid and transparent change processes. Consultants assume diverse roles dependent on the needs and want of organizations seeking change.

Change transitioned toward environmental sustainability requires the entire organization and its employees to be fully committed. The consulting process depends on levels of change taking place within an organization; micro changes involving setting up a recycling area; mid-scale interactions affecting relationships and responsibilities such as changing suppliers; and macro changes involving massive transitions to change the way an organization does its work (Gilley & Maycunich, 2000). Models of change in the research literature identify components critical to the consulting process. Five models were selected for relevance to one another in their ability to address different levels of change within an organization.

Lewin's Model of Organizational Change

Lewin's research in 1951 modeled the basics of organizational change and the desire to improve effectiveness. He identified three steps in the change process: *unfreezing*, *moving*, and *refreezing*. Working together, these three steps produce change.

Unfreezing, or conditioning the organization for change, requires establishing ownership as well as stakeholders influencing change within the organization. Moving, often considered transformation, encompasses actions taken by organizations to redefine or reinvent themselves to achieve their goals and objectives. During moving, an organization may be perceived as out of equilibrium. The final stage in Lewin's model is the action of refreezing the organization, or in other words, reestablishing equilibrium within the organization (Gilley & Maycunich, 2000). Still used, this model helps moves an organizational system from its current level of behavior and operations to a newer, desired level in three steps or phases.

Mager and Pipe Model

Introduced in 1983, Mager and Pipe's Model of Performance Analysis and Needs Assessment relies on a series of questions creating an extensive methodology analyzing a performance problem to determine an appropriate solution. While changes may be indicative of three of the model's thirteen steps, more complex changes may require all thirteen steps. These steps are sequenced emphasizing danger in leaping from problem to solution without actually analyzing cause. Performance analysis allows a consultant to solve a problem in a timely manner without wasting valuable organizational resources.

A critical relationship exists between *performance analysis* and *needs assessment*. A preliminary study of needs helps consultants identify plausible solutions. During this phase, the consultant determines if more in-depth training may be needed. Once possible solutions have been identified, development of instructional programs and/or materials to help reach objectives and a successful solution may be implemented.

Key steps to productive performance analysis and needs assessment using this model include: understanding the organization's values, objectives, and clientele;

- defining a gap by documenting differences between what is and what should be;
- clarifying cost by identifying costs to fix a problem, and conversely, loss if nothing is done;
- focusing on key sources or people who have the greatest perspective on the problem, and those with enough power to implement change; and
- focus on facts and results by finding data through observations, records, and experience.

Together these six steps work alongside a series of questions asked by the consultant to identify gaps in performance and needs (Mager & Pipe, 1997).

Human Performance Technology Model (HPT)

HPT models focus on improving organizational efficiencies while at the same time visually representing complex causal relationships within the organization. By definition, HPT models use systematic approaches to improve productivity and competence. Analysis, intervention selection, design and development, and evaluation are structured to influence behavior and accomplishment throughout the organization (ISPI, 2010).

Similar to models addressing performance improvement, HPT models begin with analyses of existing discrepancies, or gaps, between desired levels and actual levels within the organization. Causal analysis is completed to determine possible interventions to be introduced within the work environment. Next, the consultant carries out intervention selection, intervention design and development. Interventions may include a variety of tools and feedback systems, with evaluation always conducted after each phase of the change intervention process. This model of change utilizes intervention

implementation and change strategies, process consulting and employee development strengthened to ensure productive and lasting change is implemented within the organization (ISPI, 2010). This consulting approach is often used to find and discover gaps existing within an organization's goals and objectives utilizing a series of steps customizable to different organizational needs.

Gilley et al.'s (2001) Model for Managing Change Processes

An 11 step model proposed by Gilley, Quatro, Hoestra, Whittle, and Maycunich (2001) manages the change phases in different organizational settings. The phases are distinct; however, can overlap throughout a change process. Gilley et al.'s (2001) first three steps are *developing readiness for change*, *identifying a cast of characters*, and *creating a sense of urgency to build a foundation for change*. During these three steps, an organization's readiness for change is examined. This includes employee's assumptions about circumstances prior to enacting change, conducting stakeholder analysis of who supports change and who does not, and creating a sense of urgency to ensure change happens in a timely manner.

The next four steps, *developing the change vision*, *charting the course for change*, *conducting a diagnosis and providing feedback*, and *implementing the change initiative* focus on creating and implementing change or changes into organizations. These four steps help consultants to direct organization's change effort(s) and develop the necessary strategies to achieve desired visions. Charting a course of change involves setting up precise goals and identifying activities necessary to achieve those goals. Conducting a diagnosis of internal observations requires careful presentation and communication to the organization. During this phase, feedback on organizational problems and causes can

create resistance; therefore consultants provide constructive feedback concerning areas in need of change. In the latter part of the 11-step model, consultants work to create change that will survive. The final four stages (*obtaining sounding along the way, anchoring change into the culture, evaluating the change initiative, and terminating the change process*) focus on transitioning change into the organizational structure. During these final stages consultants work to generate “small wins” allowing employees to experience smaller, successful steps in the change process. The last two steps allow employees to make new change cornerstones of the organization with consultant support. At the same time, evaluating accomplishments of the organization are aligned with original goals. This evaluation phase allows consultants the opportunity to meet the needs of employees by assessing if change strategies were implemented. The final step during the change, “well-planned closure[,]. . .encourage[s] feedback . . .allowing each [employee] to share and reflect upon the success of the change initiative - as well as [identifying] opportunities for future collaboration” between consultant and organization (Gilley et al., 2001, p. 43).

Complex Adaptive Systems (CAS) Model for Organizational Change

The complex adaptive model for organizational change (Olsen & Eoyang, 2001) provides an alternative method to addressing organizational change without the rigidity of steps or phases.

“A complex adaptive system...behaves/evolves according to three key principles: (1) order is emergent as opposed to hierarchical; (2) the system’s history is irreversible; and (3) the system’s future is often unpredictable. The basic building block of the [complex adaptive system] are [change] agents” (Dooley, as cited in Olson & Eoyang, 2001, p. 22)

Because everything in an organization is interconnected, this model stresses integration of changes affecting each level of the organization, from the larger to the smallest parts of an organization. Within this model, consultants use three tools to create successful change. The consultant creates a boundary, or *container*, for change influencing the environment shaping the behavior of a system. By changing the container, the consultant is able to adjust and shape the speed and patterns of change. Next, *significant differences, are identified as* the consultant concentrates on resources most important to the organization. Differences within the organization prove to be most important when they shape the most important patterns. Finally, *transforming exchanges* allows for co-evolution throughout all parts of the organization. During this step, linkages are made throughout the entire structure of the organization (Olson & Eoyang, 2001). This theory allows an organization to adapt to uncertain environments in a way accommodating best-fit for the organization and maintaining a great deal of flexibility.

The Consulting Role in Organizational Change

These five models identified competencies required of consultants (Table 2). Consulting models, regardless of differing change influences and measures, require consultants to have an understanding of the objectives of the organization. None of the consulting models focused on sustainable transformations, and have not been utilized to create or implement sustainable change within organizations. However, green consultants require identical competencies in focusing on sustainable change objectives desired by client organizations. Missing is the link between organizational learning and performance evaluation. Performance improvement, placing value on knowledge acquisition, to

achieve a change toward sustainability, requires an economic perspective rather than simply identifying areas of change.

Table 2.

Approaches to Performance and Change in Models Employed by Consultants

Researcher	Model	Change Influences	Readiness for Change	Making the Change	Establishing Change
Lewin, 1951	Unfreezing, moving, and refreezing.	Unfreezing the organization; identifying the stakeholders	—	Moving	Freezing
Mager & Pipe, 1997	Analyzing a performance problem to determine an appropriate solution.	Performance analysis and needs assessment	Gap analysis	Understanding organization, values, objectives, and clientele.	Evaluation and training
ISPI, 2010	Human Performance Technology Model (HPT)	Performance analysis	Gap analysis	Intervention selection, design, development.	Intervention implementation and change strategies and consulting and employee development
Gilley, Quatro, Hoestra, Whittle, & Maycunich, 2001	11-step Model for Managing Change	Change agents	Phase 1: developing readiness for change, Phase 2: identifying a cast of characters, Phase 3: creating a sense of urgency	Phase 4: developing the change vision, Phase 5: charting the course for change, Phase 6: conducting a diagnosis and providing feed-back, Phase 7: implementing the change initiative	Phase 8: obtaining sounding along the way, Phase 9: anchoring change into the culture, Phase 10: evaluating the change initiative, Phase 11: terminating the change process
Olsen & Eoyang, 2001	Complex Adaptive Systems (CAS)	Collaboration of 3 different tools: container, significant differences, and transforming changes.	—	Setting a boundary, and focusing on significant differences	Co-evolution through transforming changes

Absorptive Capacity (ACAP)

Cohen and Levinthal (1990) introduced an economics-based model explaining the value of an organization’s ability to learn and the impact of knowledge acquisition on performance. Questioning why the level and amount of time and money spent on a firm’s research and development (R&D) played a significant role in an organization’s ability to

improve performance (Cohen & Levinthal, 1989, Lane, Koka, & Pathak, 2006), the concept of “absorptive capacity” (ACAP) revisited the relationship between internal and external knowledge. Compiling factors affecting the level of absorptive capacity within an organization, Cohen and Levinthal’s model framed the importance of knowledge acquisition, organizational learning and change, finding ACAP to be dependent upon an organization’s ability to share knowledge and communicate that knowledge internally (Lane, Koka, & Pathak, 2006).

After Cohen and Levinthal’s introduction of ACAP, Mowery, Oxley, and Silverman (1996) investigated the importance of outside influences on ACAP through the formation of strategic alliances to acquire knowledge. Explicit and tacit knowledge were explored and were found to be important to knowledge acquisition (Grant, 1996; Mowery et al., 1996). In 1997, research shifted to reveal an internalized perspective of ACAP; Easterby-Smith et al., (2008) explored organization learning, links to individuals through direct experiences of employees, power roles, and hierarchal environments within organizations.

Research continued to expand on factors contributing to knowledge acquisition in terms of the importance of both internal and external ACAP factors. Lane and Lubart (1998) focused their attention on knowledge types and alliance partners existing externally to the organization. Dyer and Singh (1998) gave priority to internal factors (i.e., routines and sharing capabilities). In 1999, Van den Bosch, et al., did not introduce new characteristics to ACAP, but instead built upon existing findings introduced earlier by Cohen and Levinthal and expanding factors related to internal organizational learning. Jones and Craven (2001) subsequently introduced the notion of change agents,

collaboration, organizational flexibility, transparency, and network formation to the inventory of existing ACAP characteristics of organizational learning.

Zahara and George (2002) re-conceptualized ACAP theory and attempted to condense internal and external factors proposing to create a new, expanded version of ACAP. In their revised model, they introduced the terms “realized” and “potential” absorptive capacity, reinforcing the influence of internal and external factors; attention again shifted to R&D expenditure and investment. Zahara and George (2002) then expanded ACAP elements to include activation triggers and innovation.

ACAP theory experienced a hiatus with a lack of subsequent direction. In 2006, Lane, et al., initiated a critical review of ACAP’s past and future direction calling for a rejuvenation of the construct, pointing followers toward a more direct path and creating their model of ACAP; this model failed to be implemented.

Factors have not been altered in the Cohen and Levinthal original model of 1990. Easterby-Smith, Graça, Antonacopoulous, and Ferdinand (2008) examined internal sources of ACAP acquisition and organizational structure, but did not explore ACAP’s construct beyond these boundaries. In 2009, Fabrizio examined reoccurring themes, at the same time introducing an innovative case study method to examine the importance of ACAP to organizational learning.

ACAP as “a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce dynamic organizational capability[ies]” (Zahra & George, 2002, p. 186), can be considered a plausible approach for consultants working with clients. When these clients seek to achieve change influencing performance improvement in today’s ever changing and fast-paced business

climate, tools and strategies can be revealing in terms of their conceptualized approach to problem resolution. The ability to acquire new knowledge is a capability needed by organizations; consultants working toward change in organizations will be required to address this capacity in assessing organizational potential.

When ACAP theory is utilized fully within an organization, end results equate to greater and more diversified organizational knowledge across a broader range of information structured for learning. Increases in strategic knowledge help organizations create and maintain competitive advantage and leadership in their chosen industry and market segments.

Knowledge Absorption

Knowledge has emerged as the most strategically-significant resource of organizations (Grant, 1996). Research surrounding knowledge types and dimensions have been well-established through empirical findings; relevant articles concerning knowledge and absorptive capacity have identified key factors and types of knowledge present within an organization (Easterby-Smith, 1997; Grant, 1996; Lane & Lubatkin, 1998; Mowery et al., 1996).

The importance of prior knowledge in the theory of absorptive capacity has been evident since Cohen and Levinthal's first study in 1989. Since then, researchers have discovered learning to be cumulative, and because of this, learning performance is at its greatest when the objective of learning is linked to what is already known (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998; Zahra & George, 2002).

Prior knowledge defines an organizations new venture capabilities. Cohen and Levinthal (1990) stated "prior related knowledge confers an ability to recognize the value

of new information...and apply it to commercial ends (p. 128). The level of past experience influences an organization's recognition, exposure and utilization of new technologies. The amount of prior knowledge within a firm also increases the likelihood of success for new ventures. In order to successfully assimilate new knowledge into a firm, prior knowledge is, then, a basic necessity (Lane & Lubatkin, 1998; Zahra & George, 2002).

In determining the importance of prior knowledge, the significance of both tacit and explicit knowledge in organizational absorptive capacity is visible. Tacit knowledge has been associated with increases in the specialization of an individual, while explicit knowledge within a firm is what is written and passed among the organization as physically evidence (Grant, 1996). A key to success in organizational learning stems from observing tacit knowledge, acquired and stored within individuals of the firm, and communicated informally from person to person (Easterby-Smith, 1997; Grant, 1996; Lane & Lubatkin, 1998; Mowery et al., 1996)

When comparing these two dimensions of knowledge, tacit knowledge has proven to be one of the most influential dimensions within an organization. Technical capabilities and up-and-coming opportunities have the greatest potential to be realized when tacit knowledge among the individuals runs high within the organization (Mowery et al., 1996).

When tacit and explicit knowledge have been realized and utilized, next, outlets for external knowledge are determined. Researched first by Cohen and Levinthal in 1989, external knowledge plays a major factor in the success of an organization's absorptive capacity. External knowledge increases the ability of a firm to "identify, assimilate, and

exploit” knowledge from outside environments (Cohen & Levinthal, 1989; Fabrizio, 2009; Lane et al., 2006). A reliable source for external knowledge has been the recruitment of new staff able to provide and apply external knowledge about new technologies, and at the same time recruiting these staff members provides ready access to their ideas and thinking and reduced costs in accessing these individuals, now on staff (Easterby-Smith, 1997). Greater search efficiency for new information outside the organization has resulted in increased levels of understanding fundamental, internal research systems (Fabrizio, 2009).

Finally, it is widely believed the success of an organization resides with capabilities of knowledge integration rather than knowledge itself (Grant, 1996). If influences of knowledge are unable to be integrated into an organization, knowledge (prior, tacit, external or otherwise) becomes useless to the organization. According to Grant (1996), competitive advantage resides within the ability to successfully apply and integrate knowledge into a tangible and profitable product. The integration of knowledge relies on three characteristics: efficiency (level of common knowledge), scope, and flexibility (development of new capabilities). These three factors allow knowledge to be better implemented through recognition, assimilation, and creation of commercial outputs (Grant, 1996; Lane et al., 2006). Consultants require identification of ways in which new knowledge can be obtained by organizations in their roles as change promoters and to address sustainable change based on entirely new segments of knowledge surfacing in the global marketplace.

Primary Knowledge Characteristics

In the process of transforming an organization to greater environmentally friendly positioning, identifying primary characteristics possessed by the organization is critical. These characteristics range from how employees respond to problems and adapt to new changes through to how much and in what areas money has been invested.

Activation *triggers* motivate a firm to respond to internal and external changes. These triggers come in diverse forms and act as a source of information igniting change s. In creating sustainable change, these activation triggers appear more externally to the organization than internally (Easterby-Smith, et al., 2008). External activation triggers may include a sense “of threat and crisis within the [organization] and substantially increase global market competition mainly by... [expanding] production [elsewhere]” (Easterby-Smith, et al., 2008, p. 494). In the case of environmental sustainability, organizations infrequently respond to innovations existing outside the firm, but instead create internal innovations supporting competitive advantage in the global market (Easterby-Smith, et al., 2008; Zahra & George, 2002). These activation triggers, regardless of being internal or external, are critical to motivation in organizations. They are fundamental in understanding primary knowledge characteristics in organizations. These triggers are indicators of an organizations ability to acquire new sources of knowledge existing outside the organization, and turn potential market treats into a profitable competitive advantage.

Since the beginning of absorptive capacity studies, the amount of time and money spent relative to an organization’s research and development (R&D) department has been the largest factor in determining the magnitude of skills and success within organizations.

R&D investment has been linked to absorptive capacity with over a dozen research articles pertaining to absorptive capacity, innovation, and technological opportunities (Cohen & Levinthal, 1990; Fabrizio, 2009; Jones & Craven, 2001; Zahra & George, 2002). R&D environments allow researchers to “empirically evaluate the importance of absorptive capacity for innovation (Cohen & Levinthal, 1990, p. 138). Cohen and Levinthal (1990) point out technical opportunities are often heavily related to a firm’s ongoing R&D investment, and the more spent on R&D, the higher the need for firms’ absorptive capacity.

If an organization places absorptive capacity first in terms of importance, R&D activities will automatically become a consideration relative to costs for new products or services. Whatever conditions serve as the organization’s incentive to learn, money will be spent on R&D to further motivations to acquire new knowledge (Cohen & Levinthal, 1990; Jones & Craven, 2001). R&D has been a major factor in absorptive capacity; without exploring technological opportunities, innovations would not happen. Overall, R&D creates the capacity to assimilate and exploit new knowledge; prior knowledge then tends to enhance subsequent learning because memory is associative. From these investments in knowledge technological opportunities are derived.

When an organization invests time and money in learning and finding new sources and types of knowledge, technological opportunities have more often than not the first benefit to be realized (Cohen & Levinthal, 1990). Technological opportunities lead to innovative products, creating competitive advantage. For organizations working toward sustainable change, these opportunities and innovations create a market demand ultimately affecting the bottom line by enhancing social accountability, effecting

individual perceptions, and resulting in enhanced performance. These improvements provide organizations with continued efficiency in operations. Increased knowledge helps organizations understand, explore, define, and implement sustainability into innovative products and services (Luttrupp & Lagerstedt, 2006; Waage, 2007).

In addition to knowledge acquisition, two additional components considered in Cohen and Levinthal's full model of absorptive capacity include organizational structure and intra-organizational scope (Table 1). These components are important to conceptualization of how organizations learn and transfer knowledge.

Organizational Structure

Organizational learning as an important factor in an organization's ability to acquire knowledge has led to the desire to understand the ideal organizational structure supportive of new knowledge acquisition. Organizational structures create the foundation upon which knowledge can be learned and successfully applied (Easterby-Smith, 1997; Jansen et al., 2005). Structure determines how knowledge is learned and transferred among employees. Hierarchical systems filter knowledge from the top down, transferring new knowledge in an outdated, status quo manner (Easterby-Smith, 1997); in contrast, flat, organic structures without boundaries can impede knowledge transformation without horizontal mechanisms for communication.

In flat organizational structures, employees are empowered by lack of management layering allowing them to learn multiple tasks, inadvertently spreading knowledge within the organization. Cross-functional assignments have become an even more powerful source of knowledge assimilation; empowering employees across multiple

areas of the firm assimilates and exploits new knowledge successfully (Cohen & Levinthal, 1990; Easterby-Smith, 1997; Fabrizio, 2009; Lane et al., 2006).

The ability of an organization to disseminate roles and responsibilities brings together different sources of expertise and increases lateral interaction between areas of the firm. In turn, functional components of existing knowledge are increased (Cohen & Levinthal, 1980; Jansen et al., 2005). Organizational structures focused on cross-functional assignment and integration of responsibilities allows a firm to develop broad and active networks of internal and external relationships. Other benefits have included increased awareness of other's capabilities ultimately allowing overall knowledge in the firm to be strengthened (Cohen & Levinthal, 1990).

Inside every organization, learning involves transfer of knowledge among different internal units. Distribution of information occurs across linked organizational units (Tsai, 2001) embraces improved understanding of organizational successes and failures. Because units within a firm have differences in knowledge bases and access, distribution of information has a significant impact on an organization's performance (Cohen & Levinthal, 1990; Grant, 1996; Tsai, 2001). Research findings suggest organizational structures reflect differing internal units possessing and acquiring different sources for new knowledge and technological opportunities. Accessing outlets for diversity of knowledge allows the organization to increase cost efficiency using the approach of only adopting "best practices" (Grant, 1996; Lane et al., 2006; Tsai, 2001).

Inter-Organizational Scope

Using external contacts as a source of knowledge has been recognized as strengthening the absorptive capacity of organizations, although organizations often fail

to take advantage of these opportunities (Cohen & Levinthal, 1990; Easterby-Smith, et al., 2008). A major factor in recognizing external outlets for information depends on internal knowledge and interests of organization members. Research findings have identified member recognition of opportunities as the largest factor in acknowledging and utilizing external contacts (Cohen & Levinthal, 1990; Easterby-Smith, et al., 2008; Fabrizio, 2009). As Dyer and Singh (1998) noted, “Firms ... able to accumulate [external] resources and capabilities that are rare [and] valuable...will achieve a competitive advantage over competing firms” (p. 660).

Capitalizing on a diverse group of individuals leads to the spark generating new knowledge sources. The ability to identify and value diversity leads to new policies and procedures facilitating knowledge sharing and leading to future opportunities (Lane et al., 2006).

When these experiences are derived from senior management, significant changes in values and practices encouraged across the organization can occur remarkably fast (Cohen & Levinthal, 1990; Easterby-Smith, 1997). Even when diverse perceptions are located elsewhere in the organization, useful information can emerge and provide robust learning, increasing the chances of incoming information relating to what is already known (Cohen and Levinthal, 1990); knowledge diversity facilitates the innovation process by allowing individuals anywhere within the firm to make novel associations and linkages. These innovations are imperative to successfully incorporate sustainable changes.

Finally, transparency of organizational procedures increases consumer support and potential for profit. Research findings concluded consumer awareness of an

organization's actions impacts purchase intentions (Dickson, 2000; Mohr et al., 2001). One simple way of increasing awareness is to increase knowledge through transparency of organizational action.

Role of Consultants as Change Agents

Change agents, similar to alliances, benefit an organization by teaching expertise in otherwise lacking subject areas. Change agents create diversity by discovering where critical expertise resides within the firm (Dyer & Singh, 1998; Jones & Craven, 2001) and are beneficial in helping to identify the benefits of acquiring new knowledge. "change agents are key to the ability of organizations to acquire, assimilate, transform, and exploit new knowledge" (Jones, 2006, p. 368).

Knowledge Acquisition to Achieve Sustainable Change

Sustainable practice has become a method for increasing competitiveness in a global market by decreasing environmental impacts. Enhancing the product development system can be achieved through increased knowledge, environmental performance, and enhanced management systems. Eco-design has been characterized by creating a market for the socially conscious consumer, and investing in overall social well-being and implementing environmentally-focused practices inviting increased revenue, and ultimately benefiting the bottom line. Sustainable transformation invites the green consultant to the change management team as an external source of knowledge. Organizations often lack this new knowledge, external or internal, to achieve sustainable objectives. However, the means and methods by which consultants specialize and seek knowledge from their clients in this venue of sustainable practices remains unclear.

Conceptual Framework

This study investigates knowledge acquisition strategies employed by green consultants creating sustainable transitions for diverse organizations. If knowledge absorption is truly a measure which influences and enhances organizational transitions toward sustainable practices, actions by green consultants should reveal tactics to evaluate and employ knowledge acquisition by clients reinforcing ACAP theory. Factors considered by green consultants in their work with clients require the consultant to determine internal and external influences impacting the organizations capabilities in knowledge absorption. Gauging the absorption of new knowledge then becomes the focus of the consultant's activities to achieve lasting and sustainable change for organizations.

The model for this study (Figure 2) suggests green consultants assess both internal and external knowledge sources. Consultants identify kinds of knowledge, means of transfer, knowledge opportunity, activation triggers for change, and problem-solving skills employed by the client organization to assess readiness for change and the organization's level of skill, and existing knowledge.

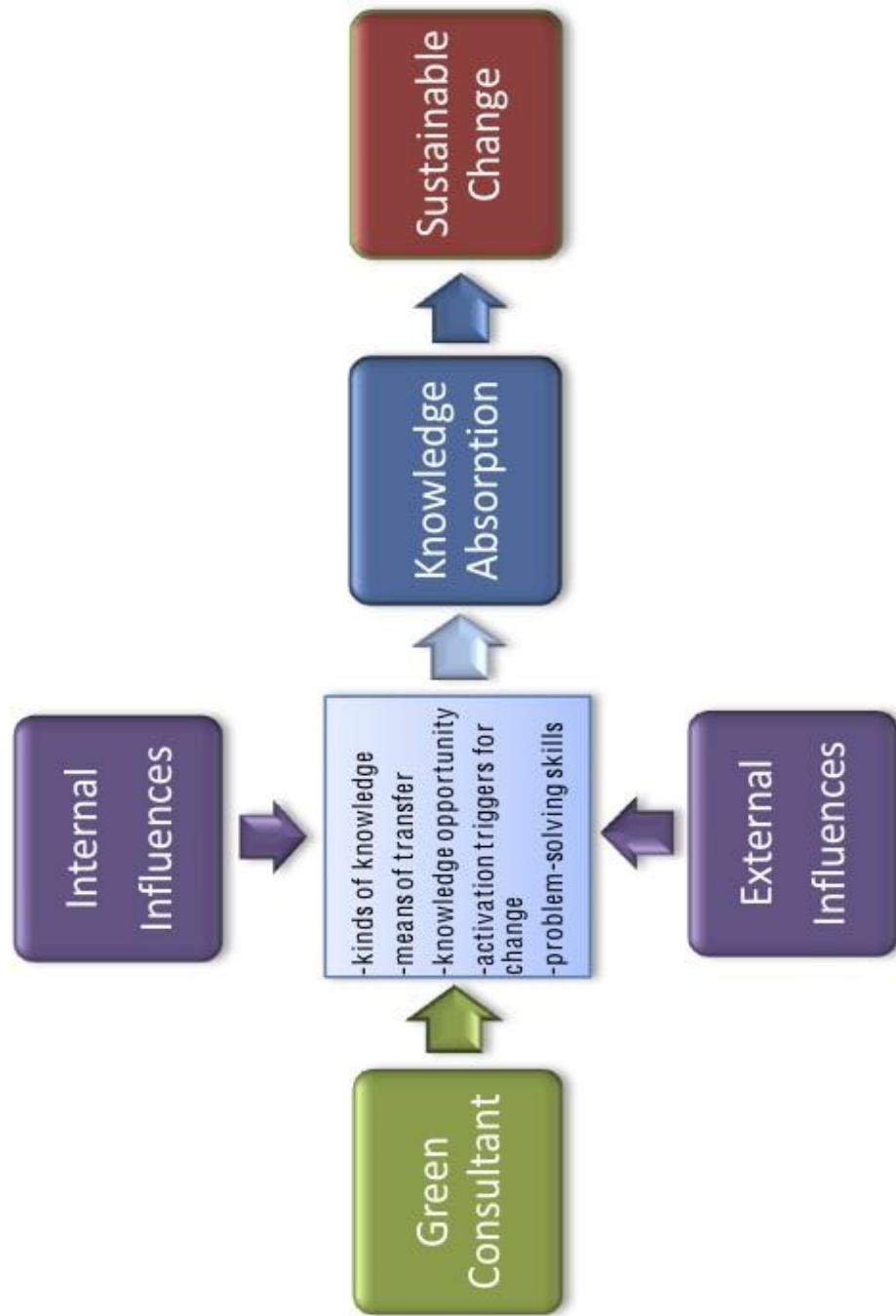


Figure 2. Conceptual framework model (Badding, 2010) ©

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

This study explored the role of green consultants' use and application of absorptive capacity (ACAP) factors (refer to Table 1). Organizations seeking to promote, implement or achieve change enabling sustainable performance are empowered by an increased capacity to absorb new sources of knowledge. Although green consultant's may choose a variety of strategies and models to direct organizational change behavior, the model of absorptive capacity strengthens performance improvement by linking acquisition of knowledge transformation features to measures of productivity. Senge's (1990) vision of learning organizations failed to develop an implementation strategy and invites Cohen and Levinthal's (1990) approach to absorptive capacity to validate performance. Sustainability, as a major global objective for many organizations and as a developing role in the domain of consulting, could benefit from practice approaches framed by the ACAP model.

Population and Sampling Frame

Participants were drawn from consultants identified as working with clients who desired to make a change toward greater sustainability using the appendix from *The Sustainability Revolution* (2005); twenty organizations were identified as providing

consulting services focused on sustainability. Additional participants for the study were added to the initial list through a search of articles, press announcements, merchandising organizations soliciting sustainable assistance, and consulting firms responding to organizational requests for services. The final list of potential consulting organizations included twenty-three firms, comprising the sampling frame. An individual to contact was established through general inquires made into the firm. After initial communications were made, participants within the firm volunteered; organizations were located across the U. S. (8 in CA; 4 in CO; 2 each in NY, TX, and WA; and 1 each in DC, MA, VA, WI, and Canada).

The contact individual for each consulting firm was contacted by phone, and the study was explained using the approved phone script and a set of questions was asked to pre-qualify the participant for the study. Questions sought to confirm two qualifications:

- a) experience level in green consulting; and
- b) application of strategies helping client's to obtain new external knowledge.

When individuals elected to participate, a contact e-mail was confirmed; if they chose not to participate, they were thanked with no further action taken regarding the study. Using a snowball effect, the option to recommend a colleague, associate, or individual from another organization was also asked to provide an additional individual to be contacted.

The pre-qualifying phone call required roughly 10-20 minutes. The protocol for this study was reviewed by the Research Integrity and Compliance Review Office's Institutional Review Board (IRB) at Colorado State University and was determined to be in compliance with NIH CFR 46 and the federal regulations governing review of research involving human subjects (Appendix C. IRB Protocol Letter).

Instruments and Measures

Easterby-Smith et al. (2008) used semi-structured interviews with a checklist of characteristics pertaining to absorptive capacity to collect data from firms to examine an organizations approach to identifying external knowledge sources motivated by internal interest. Their qualitative approach identified internal and external sources of information and processes leading to knowledge adoption.

Jones (2006) conducted 15 semi-structured interviews exploring absorptive capacity and routines, suggesting the need for “future research [to adopt] quantitative approaches more commonly used by those interested in absorptive capacity” (p. 369) to capture different dimensions of organizational learning specific to organizational roles.

The study design for this project incorporated qualitative and quantitative data collected from an electronic survey. Survey questions were inspired from a study by Jansen, et al. (2005), which aimed to better understand potential and realized absorptive capacity in organizations. A 5-point Likert scale (strongly disagree = 1, strongly agree = 5) collected information as an effective means to acquire data on opinions, beliefs, and attitudes (DeVellis, 2003). A common practice in quantitative research, according to DeVellis, is to include a six point response scale (i.e., “strongly disagree”, “moderately disagree”, “mildly disagree”) to accurately reflect true differences in opinion among subjects. For the purpose of this study, the use of a neutral midpoint (“neither agree nor disagree”) was added for respondents with equal attraction to both agree and disagree. In total, a seven-point Likert scale resulted.

The phone script employed during the pre-qualification contact, clarified individuals’ experience in green consulting; this information was not intended for use in the final

analysis of data. However, the pre-qualifying phone script collected data about the organization that the consultant represented, providing background information at the organizational level. The script (see Appendix A) requested:

- the firm’s philosophy and definition of sustainability and sustainable practices;
- the importance of sustainable practice;
- the consultant definition of an effective relationship with client organizations;
- depth of experience with clients to achieve sustainable practices;
- activities undertaken by the consultant in introducing and achieving clients’ sustainable objectives; and
- recommendation of another individual to participate.

Two individuals, despite screening for study qualifications, indicated they were not consultants, and identified themselves as “partners” within client firms who create “long-lasting relationships” to achieve change.

e-Survey

Individuals consenting to participate were sent an e-mail invitation with directions to accessing the survey URL. The e-Survey (Appendix B) included informed consent with the option to continue the survey process or opt out of participation. Questions encompassed five areas:

- a) background information about the participants’ experience, salary range, education and gender using a checklist;

Example: Question 6. How many years have you been in full-time practice?

- I am not a consultant
- Less than one year
- 1-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21-25 years
- 26-30 years
- Over 31 years

b) short answer responses elicited information about client types;

Example: Question 1. Describe a typical client seeking organizational change to affect sustainable practice.

c) open-ended responses asked for information about strategies, factors, tools and mechanisms used in consulting activities;

Example: Question 10. Are there formal tools (used consistently by your organization), informal tools (developed specifically for a client), or a combination (modification of a formal tool for each client)?

- d) factors related to the study constructs of knowledge absorption, and organizational structure, *Example:*

Mark your initial response to each statement; do not think about the statements too extensively.							
	strongly disagree	moderately disagree	disagree	neither agree nor disagree	agree	moderately agree	strongly agree
We help the client organization to establish the value of prior information held by the organization and/or its members.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- e) open-ended responses related to construct factors;

Example: Question 14. How do identify or suggest techniques for successful distribution of information throughout a client’s organization?

Participant anonymity was maintained by reporting data as grouped responses, with no identifying information about the individual or their organizational affiliation. Data collected through the study was secured in a locked cabinet in the office of the Co-PI. The data and study materials will be kept for three years and then destroyed according to protocol requirements.

Once participants accessed the e-Survey, they were able to return to add to responses during a four week time period. The researcher confirmed activity as the survey was in progress and sent e-mail reminders after the first and third week for incomplete surveys. Incomplete surveys initiated an e-mail request to identify the reason for not completing the e-Survey. Table 1 identifies, for each study construct, factors measured in the e-Survey.

Reliability in Quantitative Research

Agresti and Finlay (2009) suggest true reliability in quantitative research to rely on consistency of measures with a participant giving the same response when asked at a different time. If a discrepancy exists between a subject's responses, invalid and/or unreliable data may be evidenced. Methods for increased reliability include test-retest correlations, consistent responses across constructs, and accurate administration and scoring of the instrument used (Creswell, 2009). In this study, consistencies in response were sought by reversed Likert scales; use of an electronic survey assured accuracy in administration and scoring.

Validity in Quantitative Research

Quantitative measures should accurately reflect the concept(s) being studied by precisely describing what is to be measured (Agresti & Finlay, 2009, p. 11). Data validation included the recognition of both internal and external validity threat, the appropriate selection of participants, interaction of setting and treatment, and the interaction of history and treatment (i.e., what is studied cannot be generalized to past and future studies; Creswell, 2009).

The selection process for participants included pre-qualification - limited to consultants with past experience with green consulting - ensuring each participant had knowledge in what was being tested to reflect on their responses. Similar experiences between participants increased the probability of results being equally distributed and, in this study, knowledge and experience with green consultants, as well as an understanding of emerging patterns and themes related to the factors of absorptive capacity cannot be generalized to individuals' outside the bounds of this specific study. Care was also taken

to reduce influence and bias among participants and investigator by limiting responses beyond the focus of the study.

Reliability in Qualitative Research

Approaches to ensure reliability in qualitative research included checking open-ended responses to ensure they did not contain obvious mistakes appearing during transcription (Creswell, 2007, 2009). The use of a survey delivery tool provided safeguards against misrepresentation of transcripts; open-ended responses were transcribed for the researcher by the survey provider. Willis (2007) suggested use of reflective journaling as a tool when collecting and analyzing data. The use of a journal is “often helpful in explaining to others how [the researcher] arrived at [their] conclusions” (p. 221). Journaling, or the memo function of qualitative software, was used during the qualitative analysis to record interpretation decisions.

Validity in Qualitative Research

“Validity does not carry the same connotations in qualitative research as it does in quantitative research nor is it a companion of reliability or generalizability” (Creswell, 2007, p. 190). Data validity strategies used to assess accuracy of findings incorporated team checking; committee members provided input related to accuracy in research narrative and coding (Creswell, 2007). The potential for researcher bias was also cautioned and addressed by identification of any biases presented in the researcher’s perspective and assumptions’ surrounding the study. Research bias was revisited during cross checks of data coding (Creswell, 2007).

Approach to Data Collection

A list of potential consulting firms and relevant contact information was compiled and served as the participant contact list (Appendix D) from which contact attempts and responses received were recorded. After individual participants agreed to engage in the study, a time and date was set. Three participants requested to see the interview questions before continuing with the study to obtain an understanding of the research. Participant contact information was confirmed and a link to an e-Survey was sent. At the end of each interview, the invitation to recommend a colleague or mentor was extended. Thirteen individuals were referenced at the end of each phone conversation, were then contacted, and added to a separate reference contact list for interviews. Each week, participants who had yet to respond to the e-Survey were sent an automatic reminder. The interview process lasted five weeks, with the e-Survey accessible for four weeks.

Data Analysis

Qualitative data collected by the e-Survey produced more in-depth responses to the typical client profile, sustainable change tools and factors, and factors supporting knowledge absorption in green consulting. Each survey was treated as an individual case, with all questions inspected for direct and secondary responses. Survey questions were then grouped together and then coded to the template theme. Once all responses had been considered by reading and reflection to construct meaning, responses were grouped in a second round of coding reflected in Table 4.

Table 3.
Study Variables

Question #	Construct	Type	Variable	Type	Statistic	Comment
2	-	demographic	Experience with firm	ordinal	descriptive	
3	-	demographic	Gender	nominal	descriptive	
4	-	demographic	Education	nominal	descriptive	
5	-	demographic	Full-time practice	ordinal	descriptive	
6	-	client profile	Typical client	qualitative	-	Thematic coding
7	-	sustainable change	Types of sustainable change	qualitative	-	Thematic coding
8	-	readiness/mechanisms	Readiness for change	qualitative	-	Thematic coding
9	-	methods for change	Methods and approaches to advising	qualitative	-	Thematic coding
10	-	tools	Formal and Informal tools	qualitative	-	Thematic coding
11	-	factors	Factors measured	qualitative	-	Thematic coding
12	-	-	-	qualitative	-	Thematic coding
13a	Knowledge absorption	Kinds of knowledge	Prior member information	ordinal	descriptive	
13b	Knowledge absorption	Kinds of knowledge	Value of prior knowledge	ordinal	descriptive	
13c	Knowledge absorption	Kinds of knowledge	Employee experience	ordinal	descriptive	
13d	Knowledge absorption	Kinds of knowledge	Knowledge creators	ordinal	descriptive	
13e	Knowledge absorption	Kinds of knowledge	Knowledge dissemination	ordinal	descriptive	
13f	Knowledge absorption	Kinds of knowledge	Knowledge communication	ordinal	descriptive	
13g	Knowledge absorption	Kinds of knowledge	Client relationships	ordinal	descriptive	
13h	Knowledge absorption	Kinds of knowledge	Shared norms and values	ordinal	descriptive	
13i	Knowledge absorption	Means of transfer	Challenge of transfer	ordinal	descriptive	
13j	Knowledge absorption	Means of transfer	Transfer types	ordinal	descriptive	
14	Knowledge absorption	Knowledge opportunity	Measures of R&D investment	qualitative	-	Thematic coding
15	Knowledge absorption	Knowledge opportunity	Innovation application	qualitative	-	Thematic coding
16	Knowledge absorption	Knowledge opportunity	Technology opportunity	qualitative	-	Thematic coding
17	Knowledge absorption	Knowledge opportunity	Disruptive technologies	qualitative	-	Thematic coding
18	Knowledge absorption	Activation Triggers	Changing market demand	qualitative	-	Thematic coding
19	Knowledge absorption	Problem-solving skills	Disruption of traditional problem-solving skills	qualitative	-	Thematic coding
20	-	Product life cycle	Life cycle impacts	qualitative	-	Thematic coding
21	-	Products and services	Products and services introduced	qualitative	-	Thematic coding
22	-	Progress	Evaluation of progress	qualitative	-	Thematic coding

Table 4.
Emerging Themes and Patterns: Strategies, Tactics, and Reasons to Engage

Strategies	Tactics	Reasons to engage
Core business strategy	Tools	Willingness to learn
Expanding operations	Quantitative tools	Existing policies and committees
Leadership capacity	Qualitative tools	Supportive organizational structure
Shifts in internal policy	Models	Board level sign off
Partnerships	Methods	Relationship with section leaders
Organizational structure	Mentoring	
Change in management processes		

Data Collection

Consultants' organizational data was coded for key themes using the constructs as a template to enhance understanding of emerging patterns and themes in the open-ended responses. Data was organized and categorized by separating responses into the participants' strategies, tactics and reasons to engage (Table 4). Coding was reviewed by a second researcher for reliability in data themes, and the accuracy of interpretation regarding emerging themes and patterns. Journaling was used during qualitative analysis to reinforce reliability. All major topics were utilized to outline sustainable change components. Next, these topics were related to one another by the sequence strategies and tools used in the decision-making process. Topics depict the client-consultant relationship aimed at evaluating client capabilities, consultant's problem solving skills, sustainable

change strategies, and tactics to create change, which are later discussed in Chapter IV. Quantitative responses to demographic questions were pulled directly from the e-Survey, and put into pie charts to give basic information about respondents' participant profile and experience.

CHAPTER IV

DATA ANALYSIS AND FINDINGS

The purpose of this study was to assess the use of knowledge types identifiable within ACAP theory by consultants guiding clients on a path toward sustainable change. This study explored the presence of ACAP components (Cohen and Levinthal, 1990) to identify knowledge absorption in the work of green consultants. Four research questions framed the inquiry to explore implementation strategies, value, and use of knowledge absorption strategies.

- Q1: What is the role of green consultants in aiding organizations to embrace sustainable practices?
- Q2: What measures are employed by green consultants in transitioning client organizations toward sustainable practices?
- Q3: Is absorptive capacity used as a model for change, specifically in the work of green consultants?
- Q4: What factors of knowledge absorption reinforce sustainable change?

To answer each question, chapter IV was divided into four sections. First, participants' roles, activities and typical clientele seeking sustainable change were examined. Next, measures and strategies used by green consultant and the relevance of this role in creating sustainable change were observed. Subsequently, the third section

focused on factors of knowledge absorption, and perceived importance of these factors in practice. Finally, data were synthesized to construct a model of performance reinforcing sustainable change in addressing client capabilities and the consultants overall role in creating sustainable change.

Sampling Frame

The original contact list for potential participants contained 23 firms. After the first phone contact, five individuals agreed to an interview; three opted not to participate; one individual requested more information, and 14 individuals did not respond. During the second week, 15 of the original 23 firms were re-contacted (including the individual who previously requested more information), one additional participant agreed to an interview; one participant opted not to participate, and 13 individuals did not respond.

During week three of data collection, 13 individuals were re-contacted, an additional participant agreed to an interview; three opted not to participate, one individual requested more information, and eight individuals did not respond. During the fourth week, 9 of the original 23 firms had been contacted (including the individual who previously requested more information). One additional participant agreed to an interview, one participant agreed to an interview but opted not to continue participation, and seven individuals did not respond. During the final week of invitations to interview, these seven firms were re-contacted with no response. The final number of original participants agreeing to interview was $N = 8$, excluding the individual opting out after the interview (Figure 3).

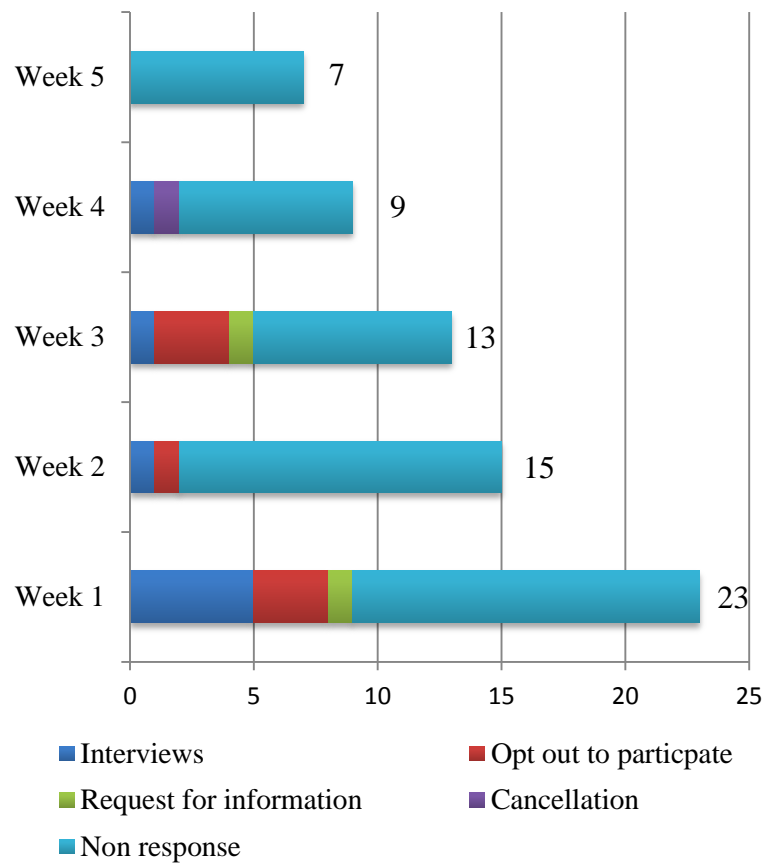


Figure 3. Week-by-week contact results for original participant list

At the conclusion of each phone interview, respondents were asked to reference a colleague or mentor. Thirteen referrals were received and subsequently contacted individually. After the first contact attempt, six individuals agreed to an interview, two opted not to participate, and two did not respond. One individual requested more information, and one individual cancelled their interview. During the second week, the three remaining individuals were re-contacted (including the individual who had previously requested more information). One participant agreed to interview with the two remaining individuals not responding. One participant agreed to an interview in week three, while the last individual did not respond. During the fourth and final contact

attempt, the remaining individual was re-contacted but, again, did not respond. The final number of referred participants was $N = 8$ (Figure 4).

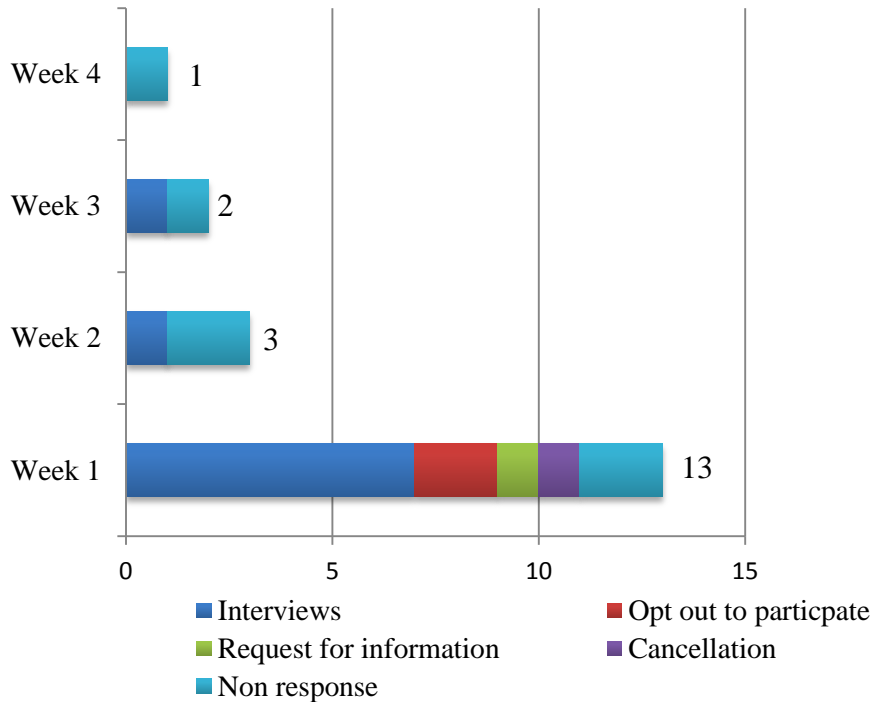


Figure 4. Week-by-week contact results for reference participant list.

Summary

From the original list of 23 individuals, eight individuals (35%) were interviewed. Of these eight, seven referenced factors related to knowledge absorption in practice and were invited to access the e-Survey URL. From the list of 13 referrals, eight individuals (62%) were interviewed. Of these eight individuals, all (100 %) exhibited use of factors related to knowledge absorption in practice and were, also, invited to access the e-Survey URL. Fifteen participants accessed the e-Survey. After the end of the four week period, eight individuals (53%) had completed the survey; $N = 8$.

Participant Profile

Gender

Of the 15 respondents invited to access the survey, six were female (40%), and 9 were male (60%). Of eight respondents completing the survey, three were female (38%), and five were male (62%, Figure 5).

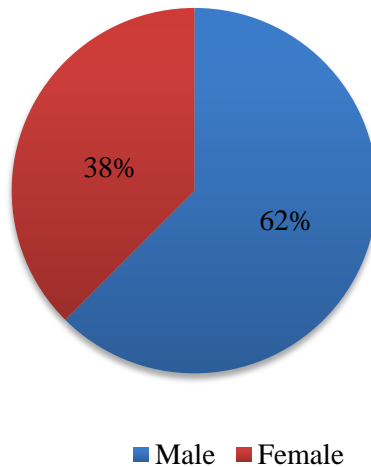


Figure 5. Gender of respondents completing survey

Years with a Firm

In examining how long respondents had worked with a specific firm or organization, 25% ($n = 2$) of respondents have been with their firm between six and 10 years. The median for this group of respondents was 11 years, while the mode, with 50% ($n = 4$) of respondents was one to five years, followed by those respondents ($n = 2$) of six-10 years (Figure 6). There was a trend in respondents, most new to their specific firm, and while it is unknown why, one can speculate it may reflect the newness of the “green movement” or the economy and job changes.

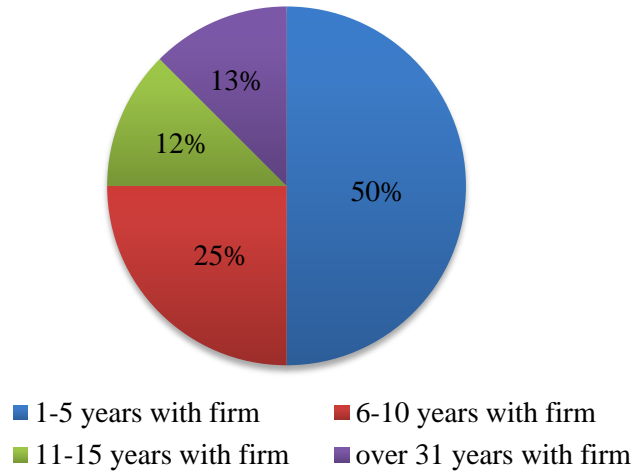


Figure 6. Respondents' years completed with current firm

Years in Full Time Practice

Overall participants represent longevity in their role as a consultant in full time practice. Six respondents (67%) had been in full time practice for 11 to 25 years. The remaining respondents ($n = 2$) were relatively new to consulting, with years in full time practice ranging from one to 10 years (Figure 7).

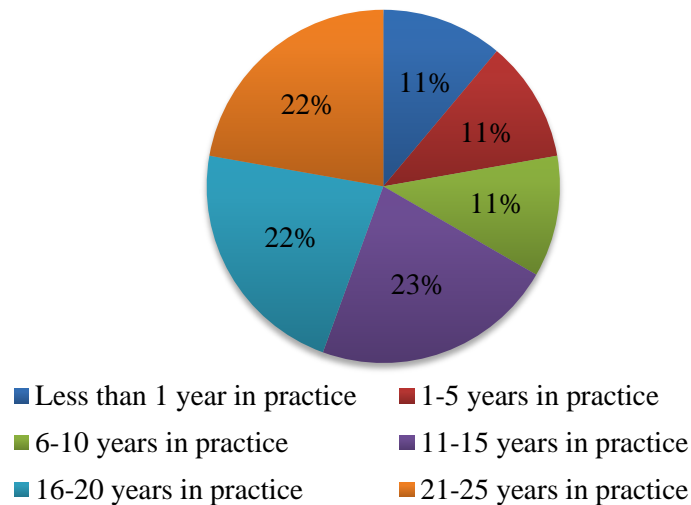


Figure 7. Respondents' years in full-time practice

Education

One respondent held a doctorate, with three respondents having earned the Master's degree, and two having earned Bachelor's degrees (Figure 8). Subject areas varied and included business strategy, environmental politics, urban planning, and engineering. Only one respondent had a degree directly related to sustainability with a concentration in sustainable development.

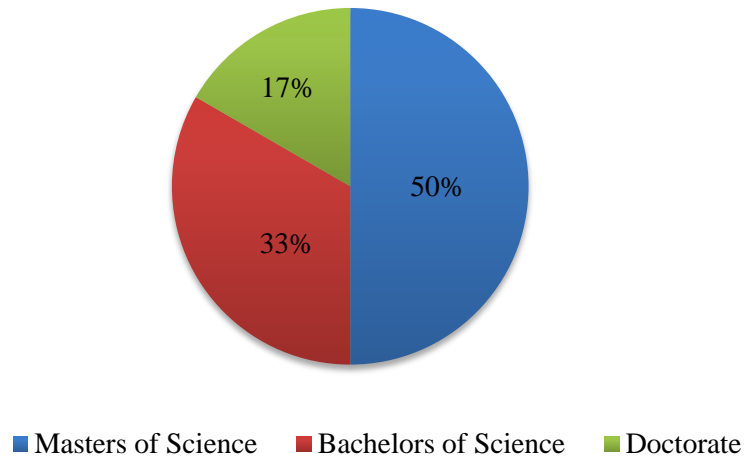


Figure 8. Reported degree type of respondents who completed survey

Typical Clientele and Change

Before analysis, one must understand the “typical” client and “typical” change from the perspective of the respondents. Fifty-seven percent ($n = 5$) of respondents described their typical clientele as large, complex, multi-national organizations. In addition, respondents also listed commercial property owners, K-12 school districts, and other educational institutes as typical clients seeking some kind of sustainable change efforts. One respondent claimed “no typical client” seeks sustainable change, suggesting this particular firm served a wide variety of clients.

When searching for types of sustainable change sought by clients, diverse responses surfaced. Seventy-one percent ($n = 6$) of respondents described an “observed” change to include incorporating sustainability principles into core business strategy. Operational change, including increased awareness of water usage and availability, carbon emissions, and waste inventory came in as the second highest response, with 29% ($n = 2$) of respondents listing this as sustainable change sought by clients. Goals and targets were indicated as methods creating future comparisons of growth and improvement.

Analysis of Responses

Two distinct foci were revealed during analysis. Data were separated during analysis into two individual sections. First, responses to qualitative, open-ended questions examined role and measures used by consultants.

Q1: What is the role of green consultants in aiding organizations to embrace sustainable practices?

Q2: What measures are employed by green consultants in transitioning client organizations toward sustainable practices?

Topics encompassed client readiness for change, consultant methods and approaches, assessment of clients learning capacity, and tools utilized during the consultant and client relationship help to gain insight into these research questions.

The second focus related to use and importance of absorptive capacity among green consultants. Research questions answered in this section were:

Q3: Is absorptive capacity used as a model for change, specifically in the work of green consultants?

Q4: What factors of knowledge absorption reinforce sustainable change?

Research Question [1]: Role of the Green Consultant

This research question explored the role of the green consultant in sustainable practices.

1: What is the role of green consultants in aiding organizations to embrace sustainable practices?

Two areas of response were considered to aid organizations in embracing sustainable change: readiness for change and the consultant's methods and approaches used.

When respondents were asked "*how do you assess a client's readiness for change?*" in order to better ascertain their perceived role in embracing change, 57% of respondents identified analysis of leadership skills of board members and looking toward organizational structure to gain an understanding of operations. Additionally, 43% of respondents reported the client's initial willingness to engage in change was influenced by an existing awareness of sustainability and environmental issues. These factors are strong indicators the organization was ready to implement change.

When looking into roles of the green consultant, respondents were asked "*what methods and approaches are used to advise client organizations?*" Forty-three percent of respondents employed the use of models to help communicate the message of sustainability. The *five capitals model* and the *natural step model* were referenced as popular models used in practice:

- Natural Step is a comprehensive model for planning in complex systems recognizing what happens in one part of a system affects every other part within it (The Natural Step, n.d.). The framework for this model utilizes tools to perform gap analysis using the lens of sustainability (The Natural Step, n.d.). Other tools and methodologies can be used in conjunction with this model; however no specifics were mentioned by name.
- Five capitals model allows any organization to broaden its understanding of financial sustainability considering environmental and social issues and their

effect on long-term profitability (Forum for the Future, 2007). The five capitals model provides a basis for understanding sustainability in terms of the creation of economic wealth, and emphasizes every organization's use of *capital* to deliver its products or services. Five types of sustainable capital exist in any organization; these five types act as the source from which organizations derive goods and services needed to improve quality of their organization and products.

- Streamlined life cycle assessments, although not specifically mentioned by name, was used by respondents as a rapid process to assessing major issues in a product or systems process in a quick and qualitative method. A result of these assessments communicates the impacts of product life cycles and benchmarks the progress of sustainability objectives (Forum for the Future, 2008).
- Individualized innovative models were also acknowledged by respondents as a tool utilized with clients, however specific identifying models were not given.

Twenty-nine percent ($n = 2$) of respondents suggested the use of future visioning, leadership exercises, and use of long and short term goals when approaching sustainable changes. Secondary responses emphasized importance of factual information in driving motivations to change.

Overall, popular methods and approaches utilized by consultants included models, future visioning and leadership exercises, the use of short and long term goals, as well as factual information to drive change and embrace sustainable practices.

Research Question [2]: Measures Employed by Consultants

The second research question explored measures in transitioning change.

2: What measures are employed by green consultants in transitioning client organizations toward sustainable practices?

Two areas were considered in aiding clients transitioning to change: formal and informal tools and factors measured within the organization.

When respondents were asked “*are there formal tools (used consistently by your firm) or informal tools (developed specifically for a client) or a combination of tools*”

(modification of a formal tool for each client) you use to work with a client?” In-depth responses referenced clients:

- data collection of energy and water use and waste accumulated
- material assessments
- current state assessments
- report benchmarking
- ambition setting tools, and
- strategy tools

Forty-three percent ($n = 3$) of respondents listed a combination of tools noted above used to achieve best possible results.

It was unclear regarding specific assessments used, how benchmarking figures were arrived at, or what precise tools were utilized. However, respondents perceived assessments, figures, and other tools used well were most likely quantitative to provide clients with information which is easily monitored for improvement.

In analyzing measures employed by green consultants, respondents were asked: *“what factors within an organization are measured/evaluated...to identify: readiness for change, learning capacity, and external knowledge acquisition?”* Factors emerged important to both sustainability and client capability. Thirty-four percent ($n = 3$) of respondents recommended use of “current state performance programs” used to evaluate client levels of awareness and understanding of sustainability issues and impacts, level of organizational ambition, and degree of employee engagement. Board level engagement and organizational structure was also given as an indication of client readiness. Seventeen

percent ($n = 1$) of responses included use of quantifiable metrics aimed at answering specific questions provided by one respondent:

- What sort of internal structure mechanisms [does the client] have in place to facilitate learning as an organization?
- [Does the client] have a way to involve and recognize employees for change?
- What sorts of external partnerships or collaboration [does the client] engage in?

Although specific responses to these questions were not provided, insight into questions such as these allowed for greater in-depth understanding into the consultants use of tools when working with clients. In establishing influencing factors, from the perspective of the consultant, one individual indicated unless there is a link to the board or CEO level of involvement, they would elect not to commit to the consulting partnership.

Research Question [3]: Absorptive Capacity in Practice.

Research question 3 utilized Likert-scale questions to discover factors related to the construct of knowledge absorption (Table 1).

3: Is absorptive capacity used as a model for change, specifically in the work of green consultants?

Findings are presented as (Table 5), tactics to acquire knowledge, providing insight to kinds of knowledge valued by green consultants. Color coding represents responses according to the amount of participant agreement.

Knowledge absorption factors most strongly supported by green consultants included the value of prior knowledge, with 75% ($n = 6$) of respondents agreeing to help client organizations establish value of prior information held by the organization and its members. Seventy-five percent ($n = 6$) of respondents also agreed they examine ways the client disseminates knowledge through their organization.

Knowledge absorption factors were supported (50%, $n = 4$) by green consultants and included:

- prior member information brought to the firm;
- uncovering hidden information acquired through past employee experience;
- the identification of knowledge creators or change agents within a firm;
- knowledge communication with others throughout the organization;
- client relationships through evidence of alliances, affiliations, and work relationships;
- examination of shared norms and values across the organization; and
- the challenge of achieving knowledge transfer in client organizations

Knowledge absorption factors perceived as important, but weakly supported among respondents included all ten factors, but in varying degrees. For example, prior member information had a range of respondents disagreeing about the collection of prior member information to a neutral position, answering “neither agree nor disagree”.

Table 5.
Tactics to Acquire Knowledge Valued Importance by Green Consultants

Factor	Variable	Strongly Disagree	Moderately Disagree	Disagree	Neither Agree nor Disagree	Agree	Moderately Agree	Strongly Agree
Kinds of knowledge	Prior member information	0%	0%	25%	25%	50%	0%	0%
Kinds of knowledge	Value of prior knowledge	0%	0%	0%	0%	75%	25%	0%
Kinds of knowledge	Employee experience	0%	0%	0%	0%	25%	25%	50%
Kinds of knowledge	Knowledge creators	0%	0%	0%	25%	0%	50%	25%
Kinds of knowledge	Knowledge dissemination	0%	0%	0%	0%	0%	75%	25%
Kinds of knowledge	Knowledge communication	0%	0%	0%	25%	25%	50%	0%
Kinds of knowledge	Client relationships	0%	0%	0%	0%	50%	25%	25%
Kinds of knowledge	Shared norms and values	0%	0%	0%	0%	50%	25%	25%
Means of transfer	Challenge of transfer	0%	0%	25%	0%	50%	25%	0%
Means of transfer	Transfer types	0%	0%	25%	25%	25%	25%	0%

Factors related to value of prior knowledge, past employee experience, knowledge dissemination, client relationships, and shared norms and values had the greatest amount of respondents agreeing, moderately agreeing, or strongly agreeing. Factors related to importance of prior member information, challenges of transfer, and differing transfer types had the least amount of respondent support with at least 25% ($n = 2$) of respondents disagreeing when asked about the importance of these factors in creating sustainable change.

Research Question [4]: Factors of Knowledge Absorption

The fourth research question examined:

4: What factors of knowledge absorption reinforce sustainable change?

Knowledge absorption, as a factor within absorptive capacity first introduced assesses the value of an organizations ability to learn and the potential impact of knowledge acquisition on performance. Grant (1996) proposed the idea of knowledge being the most strategically-significant resource of the firm, and the major factor in a green consultant's ability to successfully introduce sustainable change within a client organization.

Open-ended responses were intended to discover consultants use and the perceived importance of factors most relevant to knowledge acquisition. These factors included:

- research and development (R&D) investment
- technological opportunities
- disruptive technological opportunities
- activation triggers for change, and

- problem-solving skills

Factors were split into three major sections:

- Investment
- Change
- Problem solving

Investment. Investment into the future success of an organization is important when managing change. Specific to knowledge absorption, there are a series of factors important to future and financial investments including R&D investment, life cycle investments, and innovative approaches.

When measuring the importance of R&D investments in green consulting, 50% ($n = 4$) of consultants reported they measure R&D investment in client organizations. Respondents reported measurement of these investments initially and over the course of the clients last several years of business. Common areas of investment were also considered.

Related to value of R&D investment is the importance of innovative approaches. Innovative approaches related to advances in sustainable techniques were available to a client through the consultant's expertise in sustainable change strategies. Innovative approaches, although critical in creating a competitive advantage among industry competitors, were not the focus of all green consultants. While 67% ($n = 5$) of respondents listed the use of "interviews" in searching for innovation in client organizations, the remaining 33% ($n = 3$) of respondents answered negatively, stating they do not look for innovative approaches for/from clients seeking change.

The life cycle assessment of products allows green consultants to analyze investment of money and resources used and changes needed concerning environmental impacts from acquisition through manufacturing and distribution processes. When determining sustainable changes introduced into client life cycle assessments, respondents' answers were limited to: quantitative, high level approaches considered in conjunction with sustainable change, problem solving represented as a collection of tools. Disrupting traditional method of problem solving, technological opportunities, disruptive technologies, and triggers for change all represent factors relevant to problem solving capabilities necessary in creating sustainable changes with customized streamlined life-cycle tools, or, qualitative data evaluating where various environmental impacts are greatest.

Change. The ability to adapt to demands of a changing market is critical to organizational survival. Specific to knowledge absorption, factors relevant to change include: process and service change and feedback mechanisms.

Inquiring about process or service changes elicited no direct reply, with respondents providing varied answers including the need for board level sponsors to support change, use of goals and targets in achieving change, and the study of methods used within the industry by peers and other competitors.

Respondents described a variety of change objectives desired by client organizations. Although concise types of change were not provided, common changes provided included:

- implementation of sustainable change strategies;
- strategy integration, new methods which work to solve current, environment, and sustainable issues;

- operational change, focused on the improvement of day-to-day performance including water consumption and availability, carbon emissions, and waste management;
- internal policy; implementing rules and regulations which support the growth of sustainable change;
- system response implementation, consultants work to create an internal system responsive to growth in quantitative measures helping the client to realize growth, and the consultant to ascertain the positive changes taking place; and
- organizational structure, where consultants aim to create an infrastructure supportive of sustainable change throughout the hierarchy of an organization's internal structure.

When asked, each respondent agreed on the importance of feedback during the consultant-client relationship. However, broad measures were used in practice.

Respondents included options such as:

- use of milestones to help clients achieve growth,
- quantitative change and progress in positive data feedback systems; and,
- establishment of obtainable goals and targets.

When providing feedback to a client, respondents stressed the importance of communication whenever working to create a positive and lasting change of any scale.

Problem solving. Critical in assessing factors most salient to knowledge absorption and when investigating strategies employed by green consultants in effectively overturning a client's traditional methods of problem solving, 50% ($n = 4$) of respondents reported the effectiveness of "bringing outside people in" and "connecting people in the organization who haven't worked together" suggesting the need to expand organizational scope and the potential value of alliance partners. Secondary responses included

stakeholder engagement and the use of workshops as effective methods in problem solving.

In establishing the level of importance in problem solving techniques related to utilization of technological opportunities existing within a client business sector, one respondent mentioned the level of client investment and the degree of awareness and understanding relevant to a client's willingness to search for new and outside opportunities. One respondent answered negatively when asked about the use of technological opportunities, stating sustainable change is only "behavioral", and therefore successful change takes effect with the change in human behavior, not the integration of new technologies.

Related to the claim "*change is behavioral,*" is the concept of disruptive technologies. As new technologies are created outside the organization to enhance competitive advantage, disruptive technologies exist for the purpose of breaking routines embedded in client behavior. Sixty-seven percent ($n = 5$) of respondents agreed to the use of disruptive technologies when working with clients who may face obstacles in breaking traditional methods of practice or daily routines which reinforce bad habits.

The need to change, and ultimately the need for a consultant's problem solving skill set, resides in triggers forcing a client to desire to change. Triggers to outside stimulus provoke clients to first seek external guidance when considering sustainable change. All respondents referred to competition and market advantage as major reasons why clients seek sustainable change. Secondary triggers for change included motivation to change as well as the need to change "or die".

Not a topic originally as a characteristic of sustainable change examined in this survey, but observed many times in responses pertaining to problem solving, was the leadership capacity of the client organization. Respondents continually communicated the need for top management to endorse and perform sustainable activities at a capacity which continually improves upon past benchmarks.

Results

In summarizing themes, concepts, and clustered themes which emerged it became clear one must not think of the consultant and client as separate units, but as a joint unit working together to achieve the end result. It is important to take the independent role of consultants and individual capabilities of the client and combine them to create a model for sustainable change.

Consultant and Client Relationship

The relationship existing between the green consultant and client begins when a need for change and a want for sustainable improvement occur. Initiated by the client, the consulting process starts when a potential client seeks sustainable change achievable through an external consultant with expertise in sustainable practices. After the relationship begins, a partnership forms to support continued growth and improvements upon which sustainable change is cultivated.

Green consultants exhibit diverse roles dependent on needs of the organization seeking change. The role of the consultant is dependent upon the level of change desired within the client, however minor the change - implementing a recycling program; mid change - integration of a new manufacture into the supply change; or major change - a massive transition towards a new organizational structure, the consultant brings to this

intricate relationship a complex set of skills directed at creating a valuable and long lasting sustainable change. Figure 9 illustrates different strategies respondents of the study utilized when partaking in this relationship.

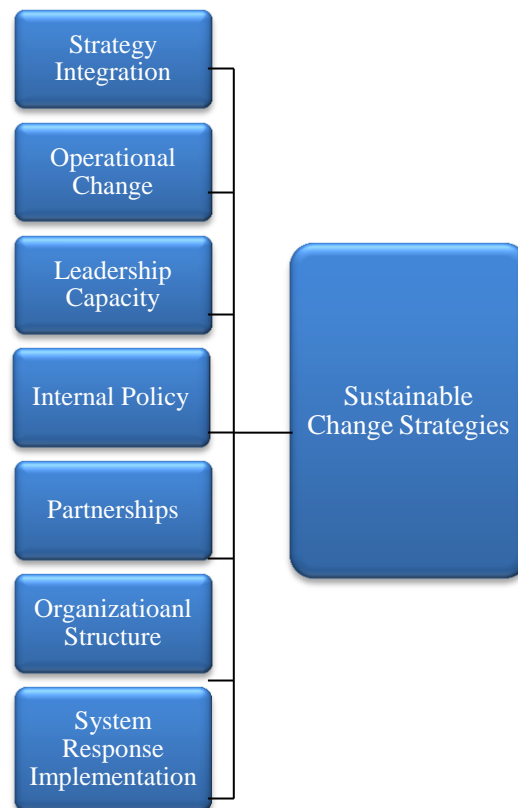


Figure 9. Component diagram for sustainable change strategies

Consultant Skills

The problem solving skills of the consultant emerged as a major factor related to knowledge absorption in creating sustainable change in the findings and a major link to the successful implementation of sustainable change strategies. The consultant's ability to solve client problems is a major factor in the success of the consultant - client relationship. Figure 10 represents important skill sets emerging from the responses.

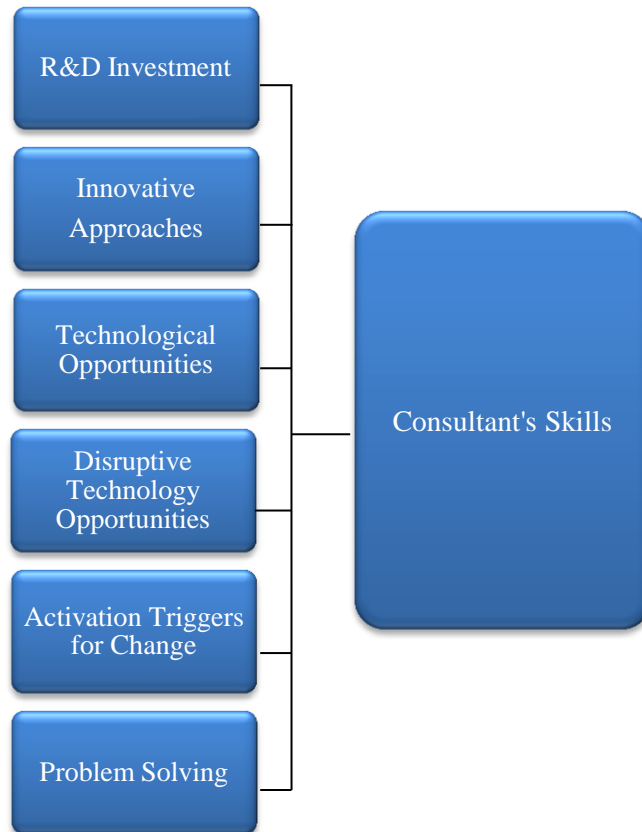


Figure 10. Component diagram for consultant's skills

Tactics

Data collected aimed to ascertain the green consultant's tools and methods utilized in sustainable change. Table 6 identified tactics for sustainable change used by consultants in the study. Tactics represent what is currently used by green consultants to create sustainable changes within client organizations, and are utilized and coordinated in a variety of ways to achieve a client's desired outcome.

Table 6.
Tactics for Sustainable Change

1. Tools	2. Models	3. Quantitative Methods	4. Qualitative Methods
Action plan development	Five Capitals Model	Baseline establishments	Material assessments
Competitor benchmarking	Innovation Models	Data collection of energy, waste, and water consumption	Staff-wide assessments
CSR insight	Streamlined LCA Models	Factual information, creating justification	Risk evaluation
Current state programs and assessments	Sustainability Models	Quantifiable metrics	
Establish ambition level	The Natural Step		
Online resources, seminars, and webinars			

It is unclear to what degree and in what combination these different tools, models, quantitative and qualitative methods were utilized in practice. However, varying amounts were used dependent upon outside factors existing in the client organization. Relevant factors included: time available for change to take place, money available, space, human capital, technology, and equipment.

Client Mentoring

From the data summarized in Table 6, as tactics for sustainable change, emerged a new tactic: “client mentoring”. Many respondents addressed support provided to clients even after a successful change had taken place. Mentoring a client allowed consultants to

ensure change had been anchored into the organization. Mentoring took many forms: vision exercises for the future, “fun” created through increased performance competition, stakeholder engagement, and employee engagement were methods utilized when maintaining communication with past clients.

Conceptual Model

This study investigated the role of the green consultant in aiding organizations to embrace change; measures employed when transiting client organizations toward sustainable practice; the use of absorptive capacity as a model for change in the work of green consultants; and finally, knowledge acquisition strategies employed by green consultants creating sustainable transitions for diverse organizations.

Findings of this study (Figure 11) support a relationship among the consultant’s role and the client’s capabilities. Utilizing sustainable change strategies (Figure 9) and the consultant’s complex set of skills (Figure 10), the consultant works with a client exhibiting existing strategies supportive of sustainable change. Determining the types of knowledge already present within the organization, green consultant’s focus on a customized approach offered through tactics for sustainable change (Table 6) to achieve organizational objectives creating a lasting and sustainable change.

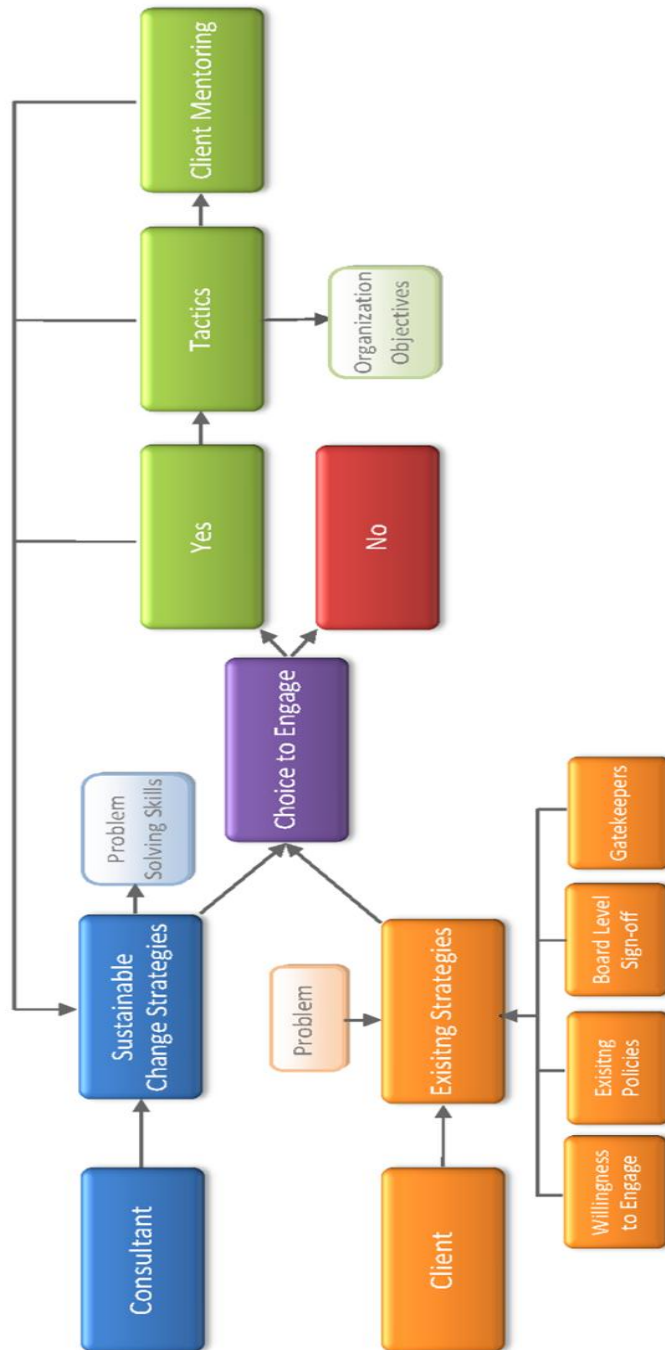


Figure 11. Sustainable change performance model (Badding, 2011) ©

CHAPTER V

DISCUSSION AND CONCLUSIONS

This research was initiated by clarifying respondents experience in green consulting, their firm's definition of "sustainable practice," and their belief in the importance of sustainable practice. An ideal relationship with a client and their actions taken to introduce and achieve sustainable change was also examined. After these broad inquiries were addressed, questions explored the respondents use of absorptive capacity constructs and their utilization of the key factors existing among knowledge absorption. These initial questions served to help obtain a more accurate picture and use of sustainable change practices within the consulting profession. Overall, this research attempted to determine if factors representing absorptive capacity and knowledge absorption were applied by green consultants when creating a sustainable change for their clients.

In critically analyzing qualitative and quantitative data supportive of the research questions proposed in this study, a series of conclusions were drawn.

Research Question [1]

When asked about roles played by consultants in aiding clients in change, consultants embraced sustainable practices by first assessing the client's readiness for change. Indicators of this conclusion included analysis of leadership skills, organizational structure, and an existing awareness of sustainability and environmental issues.

Green consultants aided clients in embracing change by implementing a variety of methods. First, the use of theoretical models, life cycle assessment, and customized innovation models created a visual representation of the change taking place in the client organization. Leadership workshops as well as visioning exercises then allowed the consultant to alter behaviors internally. Finally, green consultants embraced the progress of sustainable changes through growth. The use of short and long term goals and factual information permitted for clients to realize growth otherwise intangible to employees within the organization.

Research Question [2]

Measures employed by green consultants when transitioning client organizations toward sustainable practice included a variety of tools and methods. Data collection of quantitative benchmark information helped to create strategies used in ambition setting tools. Different models such as the natural step and five capitals models were used in conjunction with quantitative streamlined life cycle assessments and tailored innovation models to provide client organizations with information easily monitored for improvement.

Respondents evaluated client awareness and knowledge of sustainability as key factors when measuring client readiness for the change process, their learning potential,

and ability to acquire knowledge from external sources. For example, respondents often sought the client's use of already existing policies supportive of sustainable change and involvement from broad level members as key indicators a client was ready and capable of change.

Research Question [3]

Although solicitation of absorptive capacity theory in practice is apparent, they vary in practical application by green consultants. While respondents indicated use of all 10 knowledge absorption factors in practice, factors were utilized in varied degrees. The value of prior knowledge, and knowledge dissemination ranked highest among respondents with 75% ($n = 6$) agreeing or moderately agreeing to its use in sustainable change. Factors important to types of knowledge, knowledge opportunity, and means of transfer (see Table 1) reflected 50% of respondents ($n = 4$) agreeing, moderately agreeing, or strongly agreeing to its use in sustainable change. Knowledge acquisition variables scored at least 25% ($n = 2$) among respondents. Three variables: prior member information, challenge of transfer, and transfer types were scored negatively among respondents (see Table 5), however reasoning remains unknown. Data collected about the importance of knowledge absorption factors in creating sustainable change led to conclusions supporting (in varying degrees) the use of absorptive capacity theory in practice among green consultants.

Research Question [4]

Exploring which factors of knowledge absorption reinforce sustainable change, three major areas of importance were revealed. Investment, change, and problem solving were three capacities of the consultant necessary to support sustainable change. Overall,

factors related to change and problem solving skills were more relevant than R&D investment, life cycle assessments, and innovative approaches. Overall, respondents acknowledged problem solving as important when looking for and responding to technological opportunities, disruptive technologies, and triggers igniting a need for change.

Study Summary

This study differs from past studies in distinctive ways. Founders of absorptive capacity theory, Cohen and Levinthal (1990) first introduced ACAP as an economics-based model explaining the value an organizations ability to learn and impact knowledge acquisition has on the performance of an organization. Questions in Cohen and Levinthal's past studies (1989, 1990) highlighted why the level and amount of time and money spent on a firm's R&D investment influenced their ability to improve performance. This study suggests R&D investment may differ in importance among academic research and industry application of absorptive capacity.

Cohen and Levinthal (1990) stated in their research, R&D investment was a critical component in an organizations ability to absorb new sources of knowledge and consequently improve performance. In practical application of the absorptive capacity theory, respondents of this study claimed their inquiry of a client's utilization of R&D expenditure occur readily through investments initially and over time. Respondents did not increase levels of R&D investment into client organizations to create a change. This suggests the possibility there exists a difference in the application of absorptive capacity in academia and in the consulting industry.

In 2002, Zahara and George re-conceptualized the theory of absorptive capacity, and proposed ACAP to include both “potential” and “realized” knowledge. Zahara and George (2001) proposed potential knowledge to be the firm’s receptivity to acquiring and assimilating external knowledge, while, realized knowledge is the firm’s ability to transform and exploit knowledge. According to Zahara and George, both types of knowledge work with one another in the theory of absorptive capacity. This study however suggests practical application of realized and potential knowledge may be different. Respondents of this study focused on transforming sustainable knowledge to a profitable bottom line; however, they did not teach clients the skills to realize new sources of knowledge independent of the consultant-client relationship. What appears to be missing in practical application of absorptive capacity are skills needed to teach clients the process of acquiring and assimilating new knowledge. For example, respondents of this study disagreed about the value of prior member information, which is critical in the assimilation of new knowledge within an organization.

This study supports past research in the discovery of vast applications of both internal and external factors for creating change. One factor newly introduced to the constructs of absorptive capacity however, is the use of “client mentoring” in consulting. Mentoring appeared as a method providing support to clients after a successful change had taken place.

A sustainable performance model is proposed in this study, varying from past approaches to performance and change models employed by consultants (Table 2). This model supports the existence of a relationship between the consultant’s role and the clients capabilities. While models from past research had a fluid step-by-step process

where the consultant plays an external role to the client organization, the proposed performance model of this study utilizes change strategies already existing within the client to assess readiness for change. According to the proposed sustainable change performance model (Figure 11) green consultants' focus on client organizational objectives achieve the desired outcome by customizing tactics for sustainable change (Table 6) fitting specific needs of the client. Progress of change initiatives are also monitored through the use of client mentoring.

Recommendations for Future Studies

An examination of the relationship between consultant and client should be conducted to better understand an equitable partnership in the consultant - client relationship. Organizational learning and intraorganizational scope, while important, were excluded from the focus of this exploration, and should be explored as relevant factors in practical applications of absorptive capacity theory among green consultants.

It is unknown why R&D had little importance among green consultants. Factors to consider in future studies might include: time, money, human capital, learning ability of the client firm, technology, and equipment. How these factors impact the green consultants' ability to look R&D investment in client organizations should be considered when researching organizational change.

Recommendations for future studies include detailed identification of methods and procedures used by client organizations when locating new sources of knowledge focused on sustainable change (i.e., the analysis of client organizations in examining knowledge acquisition and the understanding of how different organizations apply

knowledge for profitable outcome). Examination of these factors could lead to a better understanding of the scope of absorptive capacity theory in creating sustainable change.

Study Limitations

Participants were small in number, and although the point of saturation was reached in contacting green consultants, a larger sample size would make it possible to generalize results to a broader consulting community. This study helped to determine factors related to absorptive capacity used among green consultants; however key factors of knowledge absorption may not be as prominent in application as previous research would suggest.

Research findings suggest a deficiency in consultants' awareness of other approaches salient to organizational learning, performance, and change limiting respondents' depth of services. A difference in syntax and wording from academia to industry professionals, made communication with potential participants challenging. Finally, due to the nature of this study, results cannot be projected across similar populations.

Implications

This study provided a foundation for an initial understanding of the use of absorptive capacity in green consultants working toward sustainable changes with client organizations. There exists a wide variety of measures and tools in creating sustainable change, meriting need for further studies similar to this. Constructs of knowledge absorption do not appear to be as rigid as previous thought. As Table 1 suggests, absorptive capacity is built upon three constructs: knowledge absorption, organizational learning, and intra-organizational scope. These constructs were considered to exist as

separate entities, layering use and abilities of absorptive capacity one upon another, however, findings suggest otherwise. Respondents utilized factors such as organizational structures, gatekeepers, and alliance partners (all present outside of knowledge absorption) in beginning stages of the consulting process to change. This encouraged the use of absorptive capacity constructs throughout all stages of change. Finally, equitable partnership appeared to exist between the consultant and client, providing positive feedback and enhancing the value received by green consultants.

REFERENCES

- Agresti, A., & Finlay, B. (2009). *Statistical methods for the social sciences*. Upper Saddle River, NJ: Prentice Hall.
- Anderson, T. W., & Cunningham, W. H. (1972). The socially conscious consumer. *Journal of Marketing*, 36, 23-31.
- Anatas, P. T., & Zimmerman, J. B. (2003, March 1). Design of through the 12 principles green engineering. *Environmental Science & Technology*, 95-101.
- Burke, W.W. (2008). *Organizational change: Theory and practice*. Thousand Oaks, CA: Sage Publications.
- Christensen, E. M. (1997). *The innovators dilemma: When new technologies cause great firms to fail*. Boston, MA: Harvard Business School Press.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128 - 152.
- Cohen, W.M., & Levinthal, D.A. (1989). Innovation and learning: The two faces of R&D. *The Economic Journal*, 99(397), 569-596
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.
- Creswell, J.W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: Sage Publications.
- Dickson, M. A. (2000). Personal values, beliefs, knowledge, and attitudes relating to intentions to purchase apparel from a socially responsible business. *Clothing and Textiles Research Journal*, 18(1), 19-30.
- DeVellis, R.F. (2003). *Scale development theory and applications*, (2nd ed). Thousand Oaks, CA: Sage Publications.
- Dewey, J. (1933). *How we think: A restatement of the relations of reflective thinking to the educative process*. Boston, MA: Houghton Mifflin
- Dyer, J, & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Journal*, 23(4), 660-679
- DuPont. (2009). *DuPont overview*. Retrieved from http://www2.dupont.com/Our_Company/en_US/

- Easterby-Smith, M. (1997). Disciplines of organizational learning: contributions and critiques. *Human Relations*, 50(9), 1085-1113.
- Easterby-Smith, M., Graca, M., Antonacopoulou, E., & Ferdinand, J. (2008). Absorptive capacity: A process perspective. *Management Learning*, 39(5), 483-501.
- Edwards, A. R. (2005). *The sustainability revolution: Portrait of a paradigm shift*. Gabriola Island, BC, Canada: New Society Publishers.
- Estes, J. M. (2009). *Smart green: How to implement sustainable business practices in any industry - and make money*. Hoboken, NJ: John Wiley & Sons, Inc.
- Esty, D. C., & Winston, A. S. (2009). *Green to gold how smart companies use environmental strategy to innovate, create value, and build competitive advantage*. Hoboken, NJ, John Wiley & Sons, Inc.
- Fabrizio, K.R. (2009). Absorptive capacity and the search for innovation. *Research Policy*, 38, 255-267.
- Forum for the Future. (2008, March 11). *Streamlined life cycle analysis*. Retrieved from: <http://www.forumforthefuture.org/projects/streamlined-life-cycle-analysis>
- Forum for the Future. (2007, September 15). *The five capitals model*. Retrieved from Forum for the future: <http://www.forumforthefuture.org/projects/the-five-capitals>
- Forum for the Future. (2009, June). *The five capitals model - a framework for sustainability*. Retrieved from: <http://www.forumforthefuture.org/files/The%20five%20capitals%20model.pdf>
- Forum for the Future. (2007, October 5). *TNS framework*. Retrieved from: <http://www.forumforthefuture.org/projects/TNS-framework>
- Gilley, J. W., Dean, P., & Bierema, L. (2001). *Philosophy and practice of organizational learning, performance, and change*. Cambridge, MA: Perseus Publishing
- Gilley, J. W., & Maycunich, A. (2000). *Organizational learning performance and change: An introduction to strategic human resource development*. Cambridge, MA: Perseus Publishing.
- Grant, R.M. (1996). Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organization Science*, 7(4), 365-387.
- ISPI. (2010). *HPT connections*. Retrieved from <http://www.ispi.org>

- Jansen, J., Van Den Bosch, F., & Volberda, H. (2005). Managing potential and realized absorptive capacity: How do organizational antecedents matter? *Academy of Management Journal*, 48(6), 999-1015.
- Jones, O., & Craven, M. (2001). Expanding capabilities in a mature manufacturing firm: Absorptive capacity and the TCS. *International Small Business Journal*, 19(39), 39-55.
- Jones, O. (2006). Developing absorptive capacity in mature organizations: The change agent's role. *Management Learning*, 37(3), 355-376.
- Kaebnick, H., Kara, S., & Sun, M. (2003). Sustainable product development and manufacturing by considering environmental requirements. *Robotics and Computer Integrated Manufacturing*, 19, 461-468.
- Lane, P., Koka, B., & Pathak, S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct. *Academy of Management Review*, 31(4), 833-863.
- Lane, P., Salk, J., & Lyles, M. (2001). Absorptive capacity, learning, and performance in international joint ventures. *Strategic Management Journal*, 22(12), 1139-1161.
- Levine, D.I., & Gilbert. (1999, February 16). *Knowledge transfer*. Retrieved from <http://www.irl.berkeley.edu/cohre/knowledge.html>
- Luttrupp, C., & Lagerstedt, J. (2006). EcoDesign and the ten golden rules: Generic advice for merging environmental aspects into product development. *Journal of Cleaner Productions*, 14, 1396-1408.
- Mager, R. F. & Pipe, P. (1997) *Analyzing Performance Problems* (3rd ed.) Atlanta, GA: The Center for Effective Performance, Inc.
- McDonough, W., Braungart, M., Anastas, P. T., & Zimmerman, J. B. (2003, December 1). Applying the principles engineering of green to cradle-to-cradle design. *Environmental Science & Technology*, 435-441.
- McDonough, W., & Braungart, M. (2002). *Cradle to cradle*. New York, NY: North Point Press.
- McLean, L. D. (2005). Organizational culture's influence on creativity and innovation: A review of the literature and implications for human resource development. *Advances in Developing Human Resources*, 7(2), 226-246.
- Mezirow, J. (2000). *Learning as Transformation: Critical Perspectives on a Theory in Progress*. San Francisco, CA: Jossey-Bass.

- Mohr, L. A., Webb, D. J., & Harris, K. E. (2001). Do consumers expect companies to be socially responsible? The impact of corporate social responsibility on buying behavior. *The Journal of Consumer Affairs*, 35 (1), 45-72.
- Mowery, D., Oxley, J., & Silverman, B. (1996). Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, 17, 77-91.
- Myers, D., & Stolton, S. (1999). *Organic Cotton*. London, UK: Intermediate Technology Publications.
- Olson, E.E., & Eoyang, G.H. (2001). *Facilitating organizational change*. San Francisco, CA: John Wiley & Sons, Inc.
- Revans, R.W. (1982). *The origins and growth of action learning*. Lund, Sweden: Studentlitteratur.
- Senge, P.M. (1990). *The fifth discipline: The art & practice of the learning organization*. New York, NY: Currency Doubleday.
- Sternberg, R. J. (1999). *Handbook of creativity*. New York, NY: Cambridge University Press.
- The Natural Step. *Our approach*. Retrieved from: <http://www.naturalstep.org/en/our-approach#deep-knowledge>
- Tsai, W.M. (2001). Knowledge transfer in interorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *The Academy of Management Journal*, 44(5), 996-1004.
- Van den Bosch, F., Volberda, H., & de Boer, M. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organizational Science*, 10(5), 551-568.
- Waage, S. (2007). Re-considering product design: A practical "road-map" for integrating of sustainability issues. *Journal of Cleaner Production*, 15, 638-649.
- Willis, J.W. (2007). *Foundations of qualitative research: Interpretive and critical approaches*. Thousand Oaks, CA: Sage Publications.
- Zahra, A., & George, G. (2002). Absorptive capacity: A review, re-conceptualization, and extension. *The Academy of Management Review*, 27(2), 185-203.

APPENDICES

APPENDIX A: PHONE SCRIPT

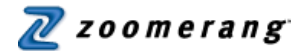
1. Does your firm have a definition of “sustainable practice”?
 - 1a. What is it?
2. Do you believe in the importance of sustainable practice?
 - Yes or No
 - 2a. Please explain:
3. How do you define your relationship with your client organization(s)?
4. What is the relationship you believe a consulting firm should have with a client?
5. Does your consulting firm work to achieve sustainable practice(s) with clients?
 - 5a. Please explain:
6. Does your firm work to increase performance in sustainable practice with client(s)?
 - 6a. Please explain or give an example:
7. Describe your role or actions taken to introduce and achieve sustainability in a specific client?
 - 7a. Please give an example:
8. How do you evaluate and measure change, e.g., when a client desires to achieve greater sustainability in their business plan, practice, and product delivery?
9. When working with clients, how do you ascertain that the client organization has a clear division between roles and responsibilities?
10. Do you have a mentor or role model in the field that you admire who has taken actions to introduce sustainability into a firm’s agenda?

Final Comment:

Do you know of anyone else who you think would enjoy talking with me about this topic?

We're finished and I would like to thank you [and invite you to complete a more detailed e-Survey on zoomerang. The survey takes 15-20 minutes to complete. I will now send to your e-mail the survey site. Thank you again]

APPENDIX B: E-SURVEY



Creating Sustainable Change

Page 1 - Image

You are invited to be in a research study examining consultant's roles in instituting change toward sustainable practice, for their client(s). Your firm was identified through industry research using The Sustainability Revolution (Edwards, 2005), a published source on becoming a green company. This study is being conducted by Dr. Ajoy Sarkar, Professor Katharine Leigh, and Sarah Badding, a Masters student in Design and Merchandising at Colorado State University, Fort Collins, CO.

Background information: In assessing economic performance in service driven organizations, it has been challenging to tie down the contributing elements that impact the bottom line and overall profit. This study explores one model developed by Cohen and Levinthal in 1990, Absorptive Capacity, which evaluates specific activities influencing change from external sources. However, we know little about what tools and approaches used in your consulting work to achieve sustainable goals.

The purpose of this study is to examine is to assess the use of factors identified with Absorptive Capacity by consultants guiding their clients on a path toward sustainable change. This study enhances existing research regarding absorptive capacity by looking for evidence of new knowledge through the lens of sustainable change.

Procedures: If you agree to this study you will be asked to do the following: Check the box below indicating you understand and agreement with the information provided in this consent form and that you wish to take the survey; and, complete the survey asking you about your industry experience (approximately 30 minutes) and ways you work with your clients

Colorado State University

Risks and Benefits of Being in the Study: This study has minimal risks. While it is not possible to fully identify all potential risks involved in these research procedures, the researcher(s) have taken reasonable safeguards to minimize any known and potential unknown risk to participants. While there are no direct benefits to you, we hope to gain more knowledge about the consultant's role in achieving sustainable change. At the conclusion of the thesis process, a summary of findings will be e-mailed to each participant.

Confidentiality: Your responses, information and the records of this study will be kept private. All data will be processed by Zoomerang, the survey provider; no identification information will be provided to the researchers or be linked to your name or email by the survey provider. In any report we might publish, no information will include any information that will make it possible to identify an individual participant or specific firm.

Voluntary Nature of the Study: Your participation in this study is entirely voluntary. Your decision whether or not to participate will not affect your current or future work or position, and will not be shared individually with your firm. If you decide to participate, you are free to withdraw at any time without affecting these relationships. If at any point you feel that you would like to withdraw from the study, simply close the survey and exit from the URL.

Contacts and Questions: The researchers conducting this study are Dr. Ajoy Sarkar and Sarah Badding. You may ask any questions you have now. If you have questions later, you may contact Sarah Badding at: sarahbe@rams.colostate.edu.

You may also contact the Research Integrity and Compliance Review Office at Colorado State University: Janell Barker, Human Rights Administrator at 970-491-1655.

You may print this form to keep for your records.

This consent document was approved by the Colorado State University Institutional Review Board for the protection of the human subjects in the research on **DATE**.
Human Subjects# 10-2127H

DO NOT PUT YOUR NAME ON ANY PART OF THE SURVEY! Thank You!

AN ANSWER TO ONE OF THESE TWO CHOICES IS REQUIRED TO CONTINUE THE SURVEY

- I understand this consent form and consent to participate. Take me to the next part of the survey.
- I do not choose to give my consent at this time. Exit me from this survey. **[Skip to End]**

How many years with this firm?

- less than 1 year
- 1-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21-25 years

- 26-30 years
- over 31 years

Page 5 - Question 3 - Choice - Multiple Answers (Bullets)

Gender

- Female
- Male

Page 6 - Question 4 - Open Ended - One or More Lines with Prompt

Degree type your last educational degree (BA, MS, Phd, etc.)

- degree
- subject area

Page 7 - Question 5 - Choice - Multiple Answers (Bullets)

How many years have you been in full-time practice as a consultant

- I am not a consultant [Screen Out]
- less than 1 year
- 1-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21-25 years
- 26-30 years
- over 31 years

Page 8 - Question 6 - Open Ended - Comments Box

Describe a typical client seeking sustainable change to affect sustainable practice.

Page 9 - Question 7 - Open Ended - Comments Box

What are the different types of sustainable change you have observed or identified while working with clients who to seek change?

Page 10 - Question 8 - Open Ended - Comments Box

How do you assess a client's readiness for change? What specific mechanisms have you used?

What methods and approaches, are used by yourself to advise the client organizations?

Are there formal tools (used consistently by your firm) or informal tools (developed specifically for a client) or a combination of tools (modification of a formal tool for each client) you use to work with a client?

What factors within an organization are measured/evaluated by you as a consultant to identify: readiness for change, learning capacity, and external knowledge acquisition

How are the factors in question 10 used to advise your client?

Consultant perspective you work with: Mark your initial response to each statement; do not think about the statements too extensively.

	strongly disagree	moderately disagree	disagree	neither agree nor disagree	agree	moderately agree	strongly agree
We collect and examine information about the organization and/or its member's prior information brought to the firm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We help the client organization to establish the value of prior information held by the organization and/or its members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We seek to uncover hidden information acquired through the employees experience in the workplace.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We identify the client's knowledge creators or change agents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

We examine ways the client disseminates knowledge through their organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We educate the client in methods of working with information not previously accessed, used or considered by the organization through communication with others in the organization (dissemination).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We seek client information about alliances, affiliations, and social work relationships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We examine shared norms and values across the organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowledge transfer is challenging to achieve in client organizations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We identify learning transfer types or levels used by the client organization/members among individuals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Page 15 - Question 14 - Open Ended - Comments Box

Do you measure/examine a client's R&D investment? If you do, explain your approach.

Page 16 - Question 15 - Open Ended - Comments Box

Do you collect information about innovation application taken by the organization? How is this accomplished?

Page 17 - Question 16 - Open Ended - Comments Box

How do you establish the level of importance a client holds towards technological opportunities in their business sector?

Page 18 - Question 17 - Open Ended - Comments Box

Do you examine the client's positioning with regard to disruptive technologies influencing the client's delivery of product or service?

Page 19 - Question 18 - Open Ended - Comments Box

What triggers a client to respond to changing market demand?

Page 20 - Question 19 - Open Ended - Comments Box

What strategies do you employ to effectively overturn or disrupt clients traditional methods/practices of problem solving?

Thank You Page

Thank you for your time and your support

Screen Out Page

Thank you for your time.

The logo for Colorado State University, featuring the text "Colorado State University" in a green, serif font.

Survey Closed Page

Access to the survey is now closed. Please contact the researchers at sarahbe@rams.colostate.edu for further questions about late access to the survey.

The logo for Colorado State University, featuring the text "Colorado State University" in a green, serif font.

APPENDIX C: IRB PROTOCOL LETTER



Research Integrity &
Compliance Review Office
Office of Vice President for
Research Fort Collins, CO
80523-2011
(970) 491-1553
FAX (970) 491-2293

DATE: February 7, 2011

TO: Ajoy Sarkar, Design &
Merchandising Katharine
Leigh, Design &
Merchandising Sarah
Badding, Design &
Merchandising

A handwritten signature in cursive script that reads "Janell Barker".

FROM: Janell Barker, IRB Administrator
Research Integrity & Compliance Review Office

TITLE: Sustainable Change: Knowledge Absorption as a Factor of
Absorptive
Capacity Theory among Green Industry Consultants

IRB ID: 018-12H

Review Date: February 7, 2011

The Institutional Review Board (IRB) Administrator has reviewed this project and has declared the study exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b)(2): 5HVHDFK LQYROYLQJ WKH XVH RI HGXFDWLRQDO WHVWV, <<. VXUYH SURFHGXUHV, LQWHUYLHZ procedures or observation of public behavior, unless: a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects. The IRB determination of exemption means that:

x **You do not need to submit an application for annual continuing review.**

- x **You must carry out the research as proposed in the Exempt application**, including obtaining and documenting (signed) informed consent if stated in your application or if required by the IRB.

- x **Any modification of this research should be submitted to the IRB through an email to the IRB Administrator, prior to implementing any changes**, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

- x **Please notify the IRB if any problems or complaints of the research occur.**

Please note that you must submit all research involving human participants for review by the IRB. **Only the IRB may make the determination of exemption**, even if you conduct a similar study in the future.

APPENDIX D: PARTICIPANT CONTACT LIST

350.org	http://www.350.org
Accenture	www.accenture.com
ATKearney	http://www.atkearney.com
Blue Sky	http://www.bluesky.com
Brendle Group	http://www.brendlegroup.com/
Clean Edge, Inc.	www.cleandedge.com
Coalition for Environmentally Responsible Economies	www.ceres.org
Consultant for the Gov. of Arlington, VA	--
Consultant for the Gov. of St.Paul, MI	--
Deloitte/Domani	www.deloitte.com
Enviromedia-social marketing	http://www.enviromedia.com/
Five Winds International	http://www.fivewinds.com/
Foresight Design	http://www.foresightdesign.org/
Forum for the Future	http://www.forumforthefuture.org/
Gartner	http://www.gartner.com
Global Footprint Network	www.footprintnetwork.org
Green Biz	http://greenbiz.com
Green Canary	www.greencanary.net/
GreenBlue	www.greenblue.org
ICLEI	www.iclei.org
International Institute for Sustainable Development	http://www.iisd.org
International Society for Ecological Economies	www.ecoeco.org
Intuit (consultant for 350.org)	--
Kuhn Associates Management Advisors LLC	http://kuhnassociatesllc.com
University of Vermont Mazetti	--
Method Frameworks	http://www.mazzetti.com/ http://methodframeworks.com
Natural Capital Solutions	http://www.natcapsolutions.org/
Natural Capitalism, Inc.	www.natcapinc.com
Natural Logic, Inc.	www.natlogic.com
Paladino & Company	http://paladinoandco.com/
Redefining Progress	www.rprogress.org
SustainAbility	www.sustainability.com
SustainableBusiness.com	www.sustainablebusiness.com
Worldwatch Institute	www.worldwatch.org
YRG Sustainability	http://www.yrgsustainability.com
