2015

Using Sustainable Development as a Competitive Strategy

Pat Spearman
Walden University

Walden University

College of Management and Technology

This is to certify that the doctoral study by

Pat Spearman

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

Review Committee
Dr. Cheryl Lentz, Committee Chairperson, Doctor of Business Administration Faculty

Dr. Marilyn Simon, Committee Member, Doctor of Business Administration Faculty

Dr. Judith Blando, University Reviewer, Doctor of Business Administration Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2015

Abstract

Using Sustainable Development as a Competitive Strategy

by

Pat Spearman

MS, Episcopal Seminary of the Southwest, 1991

BS, Norfolk State University, 1977

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

August 2015

Abstract

Sustainable development reduces construction waste by 43%, generating 50% cost savings. Residential construction executives lacking adequate knowledge regarding the benefits of sustainable development practices are at a competitive disadvantage. Drawing from the diffusion of innovation theory, the purpose of this qualitative case study was to explore knowledge acquisition within the bounds of sustainable residential construction. The purposive sample size of 11 executive decision makers fulfilled the sample size requirements and enabled the extraction of meaningful data. Participants were members of the National Home Builders Association and had experience of a minimum of 5 years in residential construction. The research question addressed how to improve knowledge acquisition relating to the cost benefits of building green homes and increase the adoption rate of sustainable development among residential builders. Data were collected via semistructured telephone interviews, field observation, and document analysis. Transcribed data were validated via respondent validation, coded into 5 initial categories aligned to the focus of the research, then reduced to 3 interlocking themes of environment, competitive advantage, and marketing. Recommendations include developing comprehensive public policies, horizontal and vertical communications networks, and green banks to capitalize sustainable development programs to improve the diffusion of green innovation as a competitive advantage strategy. Business leaders could benefit from this data by integrating sustainable development practices into their business processes. Sustainable development reduces operational costs, increases competitive advantage for builders, and reduces greenhouse gas emissions. Implications for social change increase energy independence through conservation and developing a legislative policy template for comprehensive energy strategies. A comprehensive energy strategy promotes economic development, technological gains in all business sectors within the energy industry, and reduces energy costs for consumers.

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Dedication

I dedicate this research to my parents Evangelist Hazel Johnson (who planted the seeds for my spiritual growth) and Clyde R Spearman Jr (who taught me tenacity) and my grandmother Mabel H. Spearman (who cultivated my thirst for learning). I also owe a debt of gratitude to Barbara Spearman (stepmother) for your prayers and words of encouragement.

Acknowledgments

I am most grateful to God for giving me physical stamina, intellectual capability, and honoring my faith to complete this journey (Ephesians 3:20).

I acknowledge the academic team who contributed to my success in pursuit of completing this study. Heartfelt thanks to Dr. Cheryl Lentz for your thoughtful and challenging guidance, time considerations, and encouraging critique method. I am grateful to Dr. Marilyn Simon for sharing knowledge and experience related to data analysis software and literary flow, Dr. Patricia Fusch, for her guidance aligning the methodology elements in this study, and Dr. Blando for her meticulous attention to details. I thank Dr. Ronald Jones for his untiring efforts as my editor and encourager. Dr. Freda Turner and Dr. Pam Smith provided support through understanding.

I thank my siblings, Vaughn (deceased), Mildred, Garvina, Donna, Michael, Velinda, Jonnetta, Isaiah, Faith, Hazel, Angela, Shawn, and Clyde III (deceased). Your support, on this journey, was instrumental in reaching this academic goal. Thanks to Nay for helping with dinner and Gabby for your inspirational songs and playful attitude. A heartfelt thanks to Ann: Your unconditional understanding and prayerful support were invaluable. Thank you Sharlene for standing with me in prayer and solidarity to complete this journey. I thank all my nieces, nephews, and friends for your support and prayers. I dedicate this research to the *Village Giants* on whose shoulders I stand and carry the torch to attain equality and justice through committed service to humanity. Last, my sincere thanks and appreciation to members of the National Home Builders Association for sharing your time, patience, and knowledge.

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Section 1: Foundation of the Study

The United States, Europe, China, and South Korea use energy policies and sustainable development as strategic tools to achieve a competitive advantage in the global market and to create green jobs (Yi, 2013). Escalating energy and material costs, concerns for the environment, and the need to reduce natural resource consumption create sustainable development (SD) opportunities (Sharma, 2011). The implied opportunities to increase sustainable development include formidable risks such as unstable financing instruments and insufficient information regarding builders return on their investments associated with the green price premium of their initial investment (Deng & Wu, 2014).

Sustainability, as used in this study, denotes responsible economic growth to achieve current goals while protecting natural resources for future generations (Epstein, 2008). Key factors in business profitability include innovation, environmental sustainability, and managers' commitment to continuous process improvement (Bouglet, Joffre, & Simon, 2012). By definition, *green* construction uses ecologically safe materials and energy efficient design as tools to reduce resource consumption and minimize the negative effect on the environment (Farahat & Emad Bakry, 2012).

Balancing fiduciary responsibility, social concentricity, and the identification of emerging product opportunities provide the strategic tools necessary to build a competitive advantage in the global business environment (Shiller, 2013). Building green increases profit margins; however, some home builders choose the conventional process construction model because they do not have information on the cost benefits related to building green (Pinkse & Dommisse, 2009). Results from a 2013 study

indicated the savings factored into life cycle cost mitigate the initial higher costs incurred in green construction projects (Rehm & Ade, 2013). The purpose of this qualitative exploratory case study was to discover information residential builders might need regarding the cost benefits of building green homes**.**

Background of the Problem

The construction industry is the primary reason for declining natural resources (Said, Osman, Mohd Shafiei, Razak, & Rashideh, 2010). In Spain, the construction industry generates 39.27 million tons in material waste (Nagapan, Abdul Rahman, & Asmi, 2012). Exploring ways to lower construction costs and procedures to implement sustainable development practices include use raw materials, reusing building materials, and waste management during the building phase (Mokhlesian & Holmén, 2012). Sustainable development reduces construction waste by 43%, generating 50% cost savings (Mokhlesian & Holmén, 2012). Using sustainable development to support strategic planning is one way companies develop their competitive advantage through innovative leadership while increasing their profit margins (Padgett & Moura-Leite, 2012). Most business processes include various innovation levels; in a knowledge-based economy, sustainability is also an important strategic planning component (Ayuso, Rodríguez, García-Castro, & Ariño, 2011).

Sustainable innovation includes stakeholder agendas, which seemed incompatible with a businesses' financial goals (Ayuso et al., 2011). When researchers connect the environment to the larger eco-system, sustainable development improves the triple bottom line through innovation within companies' organizational structure (Bouglet et

al., 2012). The triple bottom line concept includes environmental, social, and economic factors related to cost benefit analysis and accounting (Bewley & Schneider, 2013). Innovation included building green in a measured and cautious way within the construction sector (Holm, Stauning, & Søndergård, 2011). Sociotechno regimes, sociopolitical backdrops, and sociotechnical experiment perspectives characterize the restrained approach while transitioning to green building from nonrenewable construction designs (Holm et al., 2011).

Fuerst (2009) indicated several benefits attributed to the construction industry to building green including reduced operating cost, increased productivity, enriched image as a socially responsible corporate partner, and reduced regulatory risks. Environmental concerns and resource efficiency are underlying reasons companies consider building green as a construction option (Nagarajan & Jiji, 2013). The benefits associated with building green should not obscure the inherent litigation risks (Tollin, 2011).

Problem Statement

The construction sector is a major stimulus in economic growth and economic sustainability (Nasir, Ahmed, Haas, & Goodrum, 2013). For example, the data collected in April 2014 indicated residential construction added almost $377M to the U.S. economy, a 17% increase over the $323M added in the month of April 2013 (U.S. Census Bureau Construction Expenditures, 2014). Demand for green construction continues to grow (Mokhlesian & Holmén, 2012). The construction industry lacks a template for construction companies to make the transition from conventional construction models to green construction projects (Mokhlesian & Holmén, 2012). The general business

problem was inadequate knowledge among executive decision makers within the residential building industry regarding the cost benefits of integrating sustainable development and innovation as a business process for growth (Bouglet et al., 2012). The specific business problem was some residential builders lack knowledge regarding the cost benefits of building green homes (Figge & Hahn, 2012).

Purpose Statement

The purpose of this qualitative exploratory case study was to discover the information residential builders needed regarding the cost benefits of building green homes. Eleven residential builders from the National Association of Home Builders Association participated in semistructured telephone interviews to share their experiences and perceptions of building green homes. I used participant observation, direct observation at a new residential development using green building techniques, corporate websites, brochures, and a review of archive records to demonstrate methodological triangulation. This research and study findings might affect business practice by providing residential construction companies an additional tool in developing a long-range strategy to increase their competitive advantage (Morris, 2013). The implication for positive social change includes providing information resources to small, medium and emerging (SME) residential construction companies regarding the cost and environmental benefits associated with building green homes (Bouglet et al., 2012). Building green homes using sustainable development precepts helps increase economic growth opportunities associated with the construction industry, conserve natural resources, and reduce greenhouse gas (GHG) emissions (Rehm & Ade, 2013).

Nature of the Study

The nature of this research involved a qualitative case study design to discover the information residential builders need regarding the cost benefits of building green homes. Qualitative research is exploratory and supports a researcher's quest to go beyond apparent knowledge concerning the issue to explore nuanced distinctions within a problem (Mason, 2010). The aim for this research study was to discover the information residential builders need regarding the cost benefits of building green homes and to gain insight and familiarity related to economic and environmental value (Figge & Hahn, 2012). The application of a qualitative method was appropriate for this research (Prowse & Camfield, 2013).

Exploring the information residential builders' need regarding the cost benefits of building green homes served as the purpose of this research (Bouglet et al., 2012). Exploring business processes within a real life context to discover information related to the cost benefits of building green homes required an interpretive paradigm using in depth discussions with experienced builders in the residential construction sector (Singh, 2014). The discovery related to how residential builders incorporate sustainable development in their business processes as a strategic and economic tool (Kasai & Jabbour, 2014). The case study design facilitates research meant to answer how questions versus queries related to how many (Amerson, 2011). Therefore, the case study approach provided an appropriate design for this research. Information in Section 2 provides additional clarity and comprehensive details regarding the method and design for this research.

Research Question

A thoroughly formulated research question accomplishes two objectives. The research question provides essential facts regarding the research study and explains the researcher's intentions (Yin, 2012). The foundation and central research question guiding this study addressed the knowledge acquisition process necessary for residential builders to understand the cost benefits associated with building green homes. The overarching research question was the following: What information do residential builders need regarding the cost benefits of building green homes? Providing possible answers for this central question was the primary focus for this research.

Interview Questions

First, the research goals when designing the interview questions facilitated exploration of knowledge and strategies used by residential builders based on their perceptions related to building green. Second, the participants' answers provided insights into their business model, marketing strategies, and their financial commitment related to building green (Borland & Lindgreen, 2013). Finally, cross-referencing participants' answers provided thematic understanding into the characteristics and priorities for their commitment to balance building green homes and sustainable profit margin. In their 2013 study, Ottenbacher and Harrington used expert validation through a pilot study to create construct validity. The term *expert validation* used in this study connotes the same meaning as *pilot study* for construct validity purposes. During the expert validation interviews, the participants suggested using green building and energy efficiency as interchangeable concepts to standardize the questions. The participants used green

building and energy efficiency in their responses as the colloquial context used in the residential building industry. They also suggested changing the wording in Question 4 to reflect the possibility that the builder's state may not have an energy efficiency policy or something related to building green homes. The interview questions were as follows:

Q1: What are your perceptions and awareness of building green energy efficient homes?

Q2. What do you view as the cost benefits of building energy efficient homes?

Q3. What factors do you use to convince residential builders to build green homes?

Q4. If you have energy efficiency policies within your state, how have state energy policies provided incentives for you to build green homes?

Q5. What information do you need to build green or energy efficient homes?

Q6. Describe the financial variance between the initial building costs for green construction versus conventional construction.

Q7: What additional information, not already asked, would you like to provide?

Conceptual Framework

The diffusion of innovation theory served as the conceptual framework for this study. After reviewing business theories related to sustainability, three theories emerged as possible rudiments for the conceptual framework related with this study. The theories included transition theory (Jerneck & Olsson, 2011), decision theory (Yukalov & Sornette, 2011), and diffusion of innovation theory (Kaminski, 2011). The foundation for transition theory is the notion that each crisis is an opportunity for development and

frames the research method as a way to understand long-term social transformation (Jerneck & Olsson, 2011). The process of choosing options and developing a plan to reach the desired end state defines decision theory (Yukalov & Sornette, 2011).

The transition theory goals center on using a specific crisis as an opportunity for innovation; in sustainable science, the theory also functions as an investigating process to identify sustainability gridlocks (Jerneck & Olsson, 2011). Achieving the research goals for this study necessitated including an in depth exploration of the elements necessary to expand consumer adoption after the transition stage of the innovative product. Traditional decision theory accounts for predicting human behavior in situations of uncertainty or risk. The paradoxical elements related to dynamic inconsistencies (decision makers abandon their original plan) effect outcomes related to a particular decision (Yukalov & Sornette, 2011). That dynamism was antithetical to the theoretical stability necessary for this research.

The specific business problem was some residential builders lack knowledge regarding the cost benefits of building green homes (Figge & Hahn, 2012). Answering the overarching research question included elements of transition and decision theories; the diffusion of innovation theory (DOI) yields an expanded model for the conceptual framework. The goals of DOI include defining the adoption process for new ideas, product, or services (Craig, 2013). The adoption process has five stages: (a) awareness or information, (b) interest or persuasion, (c) evaluation and decision, (d) trial and implementation, and (e) accept / reject and confirmation (Heath, 2005). The theory originated in 1903 with Tarde; in 1943 Ryan and Gross proposed the adoption process as

part of the theoretical construct, and in 1957, Rogers expanded the DOI tenets to develop technology innovation components (Kaminski, 2011). Knowledge related to building green homes includes these technological and innovation components.

Sustainable development includes considering the built environment design, ecofriendly materials, and protocols to minimize waste in the project's planning and decision making process (Whyte & Sexton, 2011). The research question design consistently aligned with the intent to focus on ascertaining sustainable development knowledge in the construction industry and to understand the benefits of green construction. Rogers' diffusion of innovation theory includes principles incorporated in improvement theories, adopters theory, the innovation-decision processes, and appropriate for this study as a conceptual frame (Woodward et al., 2014).

Definition of Terms

Knowledge base and knowledge sharing are indispensable assets for product differentiation and industry advantage in the quest to sustain a competitive advantage (Dierickx & Cool, 1989; Gupta & Govindarajan, 2000; Lippman & Rumelt, 1982 as cited in Nieves & Haller, 2014). Diffusing innovation within the residential construction industry requires sharing information regarding the cost and benefits associated with building green improves operational efficiency, minimizes adverse environmental effect, and helps companies sustain their competitive advantage (Banawi & Bilec, 2014). Businesses use terms and acronyms familiar to persons working within the enterprise. The familiarity fades when applied to settings that include laypersons or others unfamiliar with the industry's terms.

The purpose of this qualitative exploratory case study was to discover the information residential builders needed regarding the cost benefits of building green homes. Various terms within the current research study increase understanding for persons unfamiliar with the construction industry. Each defined term includes precise contextual meanings regarding sustainable development and the construction industry. The following definitions of terms included:

Building green: The building green concept relates to construction design and buildings that reflect energy efficiency, minimizes the negative effect on the environment, reduces consumption, and lessens waste when using natural resources (Gou, Prasad, & Siu-Yu Lau, 2013).

Eco-consumers: By definition, eco-consumers are persons who use their environmental consciousness as an arbiter in the purchase process for goods and services, as well as opportunities to recycle and product disposition (Luck & Ginanti, 2013).

Home Energy Rating System (HERS): The HERS standard is the measurement indicator for heating, ventilation, and air conditioning, systems in a home for efficiency and performance (Thomas & Duffy, 2013).

Inclusive growth: Purposeful growth conceived through inclusive innovation and brings positive social outcomes (George, McGahan, & Prabhu, 2012).

Inclusive innovation: Innovation designed to benefit marginalized communities as part of the performance results (George et al., 2012).

Leadership in Energy and Environmental Design (LEED): Standards developed by the U.S. Green Building Council, who identifies the standards to assess the environmental sustainability for construction projects (Fuerst, 2009).

Sustainable behavior: Individual or corporate actions influenced by a desire to reduce consumption and preserve the eco-system (Griskevicius, Cantú, & Vugt, 2012).

Assumptions, Limitations, and Delimitations

Assumptions

Research methods and basic assumptions should align based on participants' attitude toward the study and the researcher's opinion about the purpose for the study (Fox, 2013). The assumptions within this research include trust, access to the potential participant pool, participant availability, and the veracity in the answers to the research question. Gaining the participants' trust included complying with ethical research standards to respect human dignity, comporting with academic principles, ensuring integrity, and protecting the participant's anonymity (Mccormack et al., 2012). Prior to the data collection, the executive director (ED) for the Southern Nevada Home Builders Association (SNHBA), Builders Association of Northern Nevada (BANN), and the assistant vice president sustainability & green building for the National Association of Builders (NAHB) received a written request to gain access to their membership for interviewing them as part of this research project. The request included the promise of anonymity for the participants, securing the raw data obtained during the interview process on a password protected hard drive, and the study's potential benefits for their

industry (see Appendix A). The Nevada executive directors and the NAHB vice president agreed to the request (see Appendix B).

The qualitative case study approach provides a template to explore participants' lived experiences with the intent to create new ideas and confirm or change assumptions regarding consumer behavior, policy instruments, and communication strategies (Judson & Maller, 2014). The first assumption was honesty in the participant responses and the participant's ability to understand the green building tenets in the residential construction sectors (Cohen, 2012). The builders expressed their concern relating to inconsistent policies and limited consumer education as barriers delaying the adoption of energy efficient technologies in green homes. The builders also indicated the opportunity to participate in this research provided a communication outlet to express their frustration and influence change. The participants' desire for changes to accelerate the DOI within the residential construction industry provided an inherent motivation for honest answers.

The second assumption was the participants work with growth strategies to reduce their carbon footprint and the environmental effect associated with conventional construction projects. Participants using green building practices use sustainable development as a strategy to protect the environment, reduce cost, and improve energy efficiency. The study participants displayed a commitment to reducing their carbon footprint and preserving the environment for future generations.

An additional assumption, prior to the data collection and analyzing stages, included participants' and their organizations' willingness to communicate information with other residential builders regarding transition opportunities into green construction

as part of their economic growth strategies. The participants in this study were willing to share information regarding their experience in using green practices to build energy efficient homes. Coordinated policies and building horizontal and vertical communications networks would provide the structure necessary to disseminate cost benefit information to other builders.

Limitations

Integrity and anonymity occur as presumptive principles in research limitations still exist within all studies. The contemporary protocol for qualitative research limits the focus to adding to an existing body of literature restricting the researcher's opportunities to challenge existing theories using inspirational knowledge and developing interdisciplinary models as change constructs (Alvesson & Sandberg, 2013). Integrity is a presumptive principle within the research process (John, Loewenstein, & Prelec, 2012). Nonetheless, additional limitations exist in all research studies (Alvesson & Sandberg, 2013). One limitation inherent in qualitative research is selection bias because of the descriptive characteristic and limits to context analysis not suited for generalization to a larger population (Prowse & Camfield, 2013).

Harvey (2015) suggested participants' perceptions about the researcher's bias might influence responses to the research questions. Builders participating in this research study answered the questions with clarity and conviction based on their commitment to the environment. The builders' responses aligned with the data obtained through the within method triangulation including response verification, document analysis, and information obtained during site visits. Construction companies with

successful residential building experience and holding a membership in NAHB provided the participant resource pool for this study.

Inherent limitations exist in the chosen method regarding generalization applicability when disconnecting the study results from the study populations. Qualitative methods do not include statistical testing, and expanding the population also diminishes confidence in the study's findings (Sabbour, Lasi, & Tessin, 2012). Another limitation is participant bias regarding current building strategies, sustainable development options, and future expansion.

Proprietary restrictions regarding growth and investment strategies might limit information given in participant responses (King, Toole, & Fuglie, 2012). The limitation did not apply to the builders in this research because they eagerly provided information related to past, present, and future strategic goals using green building practices to expand the number of energy efficient homes in their local areas. The within method triangulation process enhanced construct validity, ensures reliability, and increases data completeness (Bekhet & Zauszniewski, 2012). Using archived documents as part of the within methodological triangulation process provided another resource to mitigate proprietary restriction limitations and ensure data completeness.

Delimitations

According to Yin (2009), delimitations frame the research by identifying case study descriptions. The primary information source for this study consisted of residential homebuilders from Nevada and other NAHB members. Contributing to the existing body of knowledge related to sustainable development and the triple bottom line for residential

builders framed the research goal. Litigating the veracity of anthropogenic climate change and recommending a strategy or course of action for builders were topics outside the scope of this research (Christy, 2013).

Significance of the Study

Contribution to Business Practice

The construction industry provides a significant contribution to economic growth in the United States (Halim, Jaafar, & Osman, 2011). In 2012, revenue from the construction industry totaled more than $558 billion to the gross domestic product and employed more than 7 million people (Banawi & Bilec, 2014). In April 2014, the $377M in residential construction represented a 57% increase over the $241M reported in January 2011 (U. S. Census Bureau Construction Expenditures, 2014). Barriers to green construction include tentative operating costs, an uncertain regulatory environment, and litigation risks (Nagapan et al., 2012). The precarious quality notwithstanding, green construction has several benefits. Increasing the number of green construction helps infrastructure development, creates local jobs to build and maintain facilities, and reduces material waste at the construction site (Nagapan et al., 2012). Rehm and Ade (2013) surveyed 631 builders to analyze cost differentiation between conventional construction methods and green buildings. Of the builders surveyed, (a) 86% believed green buildings costs were more than conventional construction, (b) 13% believed cost difference was minimal, and (c) only 1% believed green construction costs less (Rehm & Ade, 2013). Results from their data analysis did not support the builders' assertion that using green building practices increases construction costs (Rehm & Ade, 2013). Sharing

information regarding the cost and benefits associated with building green improves operational efficiency, minimizes adverse environmental effect, and helps companies sustain their competitive advantage (Banawi & Bilec, 2014).

Implications for Social Change

Expanding green construction might contribute to a comprehensive and innovative approach to energy conservation; this expansion will potentially yield $1.2 trillion gross energy savings for the U.S. economy by 2020 (Allcott & Greenstone, 2012). Building green decreases construction waste, reduces the negative effect on the environment, reduces cost overruns, and increases productivity at the construction site (Nagapan et al., 2012). Results of this study will contribute to social change by developing green construction globally, reducing natural resource consumption, and reducing the amount of material waste in landfills particularly in developing countries (Nagapan et al., 2012).

A Review of the Professional and Academic Literature

The following literature review consists of contemporary peer reviewed research for studies concerning resourcing energy needs, energy consumption and consumer behavior, opportunities for military and civilian collaborations, building green, energy policies, and innovation theories. The literature review includes peer-reviewed studies that address limitations, weaknesses, and potential for future research in each category. Other sources include government reports, statistical reports, and scholarly books. The primary resource to obtain the literature sources included Walden University library databases to identify full-text articles, scholarly journals, and peer reviewed studies. Key

words in the search criteria included *building green, eco-consumers, energy efficiency, leadership in energy and environmental design (LEED), inclusive growth, inclusive innovation, sustainable behavior,* and *diffusion of innovation theory*. The emphasis was on peer-reviewed studies that were less than 5 years old at the time of publication.

I identified and evaluated more than 2,000 articles over a period of 24 months and used 347 relevant articles in this literature review. The extensive review of articles included 263 peer reviewed articles from June 2010 - 2014, 18 from 2015, and 45 from May 2010 or earlier. The review contains 12 book references. The percent for peer-reviewed articles published within 3 to 5 years of anticipated graduation was 85%. The percent for total number of peer-reviewed articles in this study was 326 or 93.9% of the literature review.

This thematic literature review included research on energy efficiency, building green as a competitive advantage strategy, and return on investments (ROI) for residential construction development. The research goals considered in the literature review for this study included presenting multifaceted views regarding benefits and liabilities for building green homes to facilitate answering the research question and exploring knowledge regarding the cost benefits related to building green homes. This literature review accomplished the stated goals. The comprehensive literature review includes sustainability, energy policies, diffusion of innovation theory, and qualitative methods. Critically analyzing and synthesizing existing literature is an essential part in developing a cogent foundation for data collection and analysis for the research topic (Hlas & Hlas, 2012).

Two paradigms frame all research ontology and epistemology (Wahyuni, 2012). Ontology frames knowledge regarding the genesis narrative nature; epistemology frames knowledge generation, understanding, and knowledge utility (Wahyuni, 2012). Epistemology is fundamental in qualitative research setting the contextual parameters that define the influence of the what one knows on the how one knows a phenomenon (Gringeri, Barusch, & Cambron, 2013). Given the research aim for this study, epistemology framed the research question to discover the information residential builders need regarding the cost benefits of building green homes.

Knowledge base and knowledge sharing are indispensable assets for sustainable differentiation and industry advantage in the quest to sustain a competitive advantage (Dierickx & Cool, 1989; Gupta & Govindarajan, 2000; Lippman & Rumelt, 1982 as cited in Nieves & Haller, 2014). Declarative knowledge (associated with the business environment) animates strategic vision and encourages innovation while procedural knowledge (detailed knowledge of internal processes) helps to develop information channels to facilitate adaptability and change (Nieves & Haller, 2014).

Answering the research question required three fundamental components. The first part in this study identified the current strategies to sustain profitability (Mokhlesian & Holmén, 2012). The second part involved categorizing building and innovation trends within the residential construction industry (Whyte & Sexton, 2011). The last component included evaluating cost savings associated with (a) reducing natural resource material waste at the construction site, (b) operational cost savings associated with building green,

(c) reducing energy consumption, and (d) preserving the environment for future generations (Nagapan et al., 2012).

Qualitative research explores a participant's life experiences (Jones, 2013). Selecting residential builders in Nevada and the National Association of Home Builders for this exploration allowed me access to local and national companies with corresponding issues and other concerns regarding building green while maintaining profitability. Energy efficiency benefits residential end-users (Lima Azevedo, Morgan, Palmer, & Lave, 2013). Residential end-users who replaced major appliances with energy efficiency ratings yielded a 56% emission reduction (Lima Azevedo et al., 2013). Although participant responses in some ways corroborated the de facto perception and veracity of anthropogenic climate change, another theme was comprehensive energy planning that required renewable energy policy research in tandem with the energy efficiency evolution as a way to reduce dependence on fossil fuels as noted in 2012 by Allcott and Greenstone.

Sustainability and Business Strategy

In a global economy, energy efficiency is significant factor in the quest to create and maintain a competitive advantage for businesses (Kalenoja, Kallionpaa, & Rantala, 2011). Sustainability, as a business process, is the foundation for low cost business strategies that include efficiency in every aspect of the planning procedures (Stankevičiūtė, Grunda, & Bartkus, 2012). Sustainability in labor augmentation, innovation, and economic growth require dependable energy resourcing and sustainable energy systems (Solomon & Krishna, 2011). Findings from a 2014 study indicated

business strategies that include solving environmental and social challenges benefit with new product ideas and increased profitability (d' Angelo & Brunstein, 2014). Even so, leaders in some multinational corporations view sustainability as a strategic challenge (Escobar & Vredenburg, 2011).

In supply chain management (SCM), financial, environmental, and social concerns pose complex resource challenges when applied to the business triple bottom line (Hall, Matos, & Silvestre, 2012). The triple bottom line includes social, environmental, and economic concerns for businesses. Corporate social responsibility (CSR) is one method of achieving sustainability in SCM and operational costs (Hall et al., 2012). Although most corporations focus on regulatory activity and investments when business leaders integrate CSR, innovation, and sustainability as core competencies throughout their business processes they improve their bottom line and corporate image (Gomes et al., 2013).

Energy Use and Consumer Behavior

Energy was an important factor for the beginning of the Industrial Revolution (Stern & Kander, 2012). The Industrial Revolution also represented a shift from a land or agriculture economy to an economy built on fossil fuels (Stern & Kander, 2012). Before the 18th century, wood was the primary energy supplier. People harvested trees to build most tools, to heat facilities, and as engine fuel (Stern & Kander, 2012).

During the 18th century, people used coal as an energy producer to replace wood as a natural resource (Tran, 2010). The primary energy resource in the 19th and 20th centuries came from nonrenewable natural resources. The world's energy consumption

doubled during the last 3 decades of the 20th century. If the demand trajectory continues, unabated, the consumption rate of British thermal units (BTU) will be 702 quadrillion BTUs by the year 2030 (Perțicaș, 2012). Despite these high numbers, consumers' appetite for more energy appears insatiable, and energy consumption continues to grow (Stern & Kander, 2012).

As the primary consumer of global fossil fuels, the United States used almost 20 barrels of crude oil per day in 2008 (Alquist & Gervais, 2013). In the same year, the United States purchased approximately 25% of the oil produced in the Middle East (Tran, 2010). Population growth, demographic trends, and the level of economic activity are factors influencing increased energy demands (Recalde, Guzowski, & Zilio, 2014). In the United States, population growth and improved standards of living increased demand beyond production capability as domestic nonrenewable resources declined during the 1960s and 1970s (Faeth, 2012).

As emerging economies become more industrialized, their energy demands increase in proportion to those needs (Stern & Kander, 2012). The ratio of consumer to consumption reflects more than a 17% increase in demand for energy (Farber, 2012). Between January 2013 and June 2013, U.S. fossil fuel production was 31.278 quad trillion BTUs. Consumption during the same period was 39.427 BTUs: This represents a delta of 8.149 quad trillion BTUs for the first half of the year (U.S. Energy Information Administration, 2013). Increases in population growth, mounting human waste, and rapid depletion of fossil fuel resources suggests this imbalance in supply and demand is not sustainable (Mirchandani & Ikerd, 2008).

Military and Civilian Partnerships to Increase Energy Efficiency

The United States consumes 25% of the world's energy production (Closson, 2013). In 2010, Department of Defense (DoD) use accounted for 80% of the energy consumption within the federal government (Closson, 2013). The mutually supporting goals related to reduced energy consumption, increasing renewable energy resources, and energy security provide opportunities for military and commercial partnerships to advance renewable energy technologies (RET; Cable, Tayler, Tindal, Varley, & Brissey, 2010). Military testing iterations for RET projects reduce the commercial research and development costs while providing valuable information to build efficient energy systems without compromising economic competitiveness (Cable et al., 2010).

In 2010, the U.S. Army spent $13.2 billion dollars on nonrenewable fuel sources associated with military operations. Energy costs for military operations include expenses associated with facility use. The U.S. Army spends approximately $1 billion dollars on facility related energy costs (Zhivov et al., 2013). Implementing an energy efficiency program in tandem with green construction creates opportunities for facility cost savings through energy conservation (Zhivov et al., 2013). From 2002 through 2012, new requirements to retrofit older buildings and use energy efficient construction helped reduce energy cost within the U.S. DoD (Closson, 2013).

Recognizing the need for comprehensive strategic energy plan, the U.S. DoD established a Defense Operational Energy Board (U.S. DoD, 2012). The Operational Energy Board administers policies that promote a national energy security plan, use

innovation as a way to capitalize on renewable energy resources, and reduce demand and consumption through energy efficiency (U.S. DoD, 2012).

In 2010, almost 100 subject matter experts (SMEs) attended an energy use and mitigation conference. Conference attendees included representatives from the U.S. military, academia, and private industry. They met to access technological opportunities aligned with military mission requirements for near, mid, and long-term planning analysis (U.S. Army Training and Doctrine Command (TRADOC), Army Capabilities Integration Center, 2010). The conference discussions yielded several recommendations. The recommendations included creating the Operational Energy Office (OEO), establishing energy protocols, managing energy use, and minimizing environmental hazards (U.S. TRADOC, Army Capabilities Integration Center, 2010). The OEO is one example of the U.S. military's commitment to energy conservation and efficiency (OEO, 2012).

Social, scientific, and psychological research focused on climate change as the driving force behind developing more renewable energy system (RES) projects and resources with little attention to energy efficiency and other adjunct issues in a broader context (A. Fischer et al., 2012). Expanding the analysis to include business and financial implications, energy production, efficiency, and consumption provides a path to move beyond technical disagreements and focus on using RES projects to secure energy independence and as an engine for economic growth (A. Fischer et al., 2012). Controlling production costs and mitigating the effects of price volatility associated with the cost of supply and demand provide additional incentives for increasing investments

for RES (Larrosa, Casaravilla, & Chaer, 2012). The national decline in nonrenewable energy sources creates business opportunities for alternative energy enterprises (Fouquet, 2010).

The initial financial investment and uncertain outcome limit the number of innovations and innovative technology entering the commercial market (Liu, Yeung, Lo, & Cheng, 2014). Military innovations mitigate financial risk associated with developing small scale prototypes for research testing (Cable et al., 2010). Technology developed by the military to protect service members has utility in commercial markets. For example, civilian hospitals and disaster relief organizations use the medical system protocols developed during the Korean War to save lives, and law enforcement officers benefit from the technology improvements in the battlefield body armor used in bullet proof vest (Baker, 2012). Learning and sharing lessons provide a reciprocal relationship between the military and private sector as demonstrated by the U.S. Army adopting data analysis procedures from the business sector's best practices to provide effectiveness and efficiency in military operations (Powell, 2014). Using the private public partnership principles to develop energy efficient systems increases innovative opportunities while minimizing adverse financial risk in the private sector (Cable et al., 2010).

Nonrenewable Versus Renewable Resources

Nonrenewable energy resources contribute to every facet of daily activities and consumer familiarity. The favorable costs for oil and gas as incumbent energy resources creates difficulty in the transition from nonrenewable energy resources to renewable energy (Outka, 2012). Electricity pricing reform and transitioning from restrained

monopoly into market-based pricing system compound these challenges limiting unrestricted integration between electricity and renewable energy alternative (Chao, 2011). Heretofore, energy policy discussions related to minimizing greenhouse gases focused on developing alternative energy resources through renewable portfolio standards (RPS) established by state legislators with minimum emphasis on energy efficiency (Brennan, 2013).

Fossil fuel volatility is also a contributing factor in energy pricing (Baccini & Urpelainen, 2012). Political unrest in the Middle East, an explosion at a U.S. oil refinery, or acts of terrorism usually bring higher fuel prices (Alquist & Gervais, 2013). The simultaneous chronology may suggest a relationship between higher prices is causal versus casual. In their 2013 study, Alquist and Gervais (2013) explored a possible relationship between calamities related to fossil fuel resources and concluded macroeconomics in global supply and demand affected the price of oil futures more than other variables.

At least two juxtaposing opinions frame the argument for or against the urgency to develop more renewable energy sources. First, increased demand and declining fossil fuel resources necessitate transitioning to renewable resources (Ahmad & Tahar, 2014). Another opinion frames the urgency within the context of apocalyptic forecasting, not the precipitous decline of nonrenewable energy resources (Bisk, 2012).

The definition for renewable energy resources initially appears incompatible with energy efficiency as a function of environmental policy pursuits (Brennan, 2013). Electric utility companies and state governments recognize the need to include alternative

fuel resources and demand reduction as part of a broad strategy in energy policy development (Barbose, Sanstad, & Goldman, 2014). In the United States, strategic level policy discussions include renewable energy and energy efficiency as components to increase energy security and decrease economic vulnerabilities caused by fluctuating fuel prices or geopolitical events (Benea & Baciu, 2012).

Building Green

The sustainable building and design market continues to expand as consumer spending trends toward environmentally responsive performance (Tromp, Hekkert, & Verbeek, 2011). The anticipated cost, risk, and limited knowledge of sustainability as a strategic tool causes trepidation (Bouglet et al., 2012). The hesitation might limit the company's profitability and competitive advantage in the residential construction industry (Pinkse & Dommisse, 2009). The results from Giang and Sui Pheng's (2011) research indicated a significant relationship between the construction trade and industrial growth in emerging economies. Integrating policy development between construction and other industries is necessary to sustain growth in the construction industry (Giang & Sui Pheng, 2011).

Globally, construction and facility operational use account for 40% of energy consumption (Deng & Wu, 2014). In the United States, energy construction costs average 30% for commercial building projects and account for a significant portion of business operational budget (Eichholtz, Kok, & Quigley, 2013). However, a gap exists in academic and business literature regarding the benefits for residential construction companies as an incentive to transition to building green (Deng & Wu, 2014). The

existing literature gap regarding benefits of building green is the keystone for this study, while the research question provides the study's context.

Green construction offers one approach to residential builders for brand differentiation and target marketing to eco-consumers (Elliott, 2013). The anticipated costs, risks, and limited knowledge regarding building green creates trepidation for some builders (Bouglet et al., 2012). This hesitation might limit the company's profitability and competitive advantage in the residential construction industry (Laursen & Salter, 2014). However, improving access to information channels promoting support for green construction might facilitate necessary changes throughout the industry for horizontal and vertical brand differentiation for residential builders (Makadok & Ross, 2013).

Residential builders ascribing to the traditional single bottom line versus the triple bottom line may not be aware of the opportunity to increase their ROI exponentially using green building practices using a triple bottom line business model (Mokhlesian & Holmén, 2012). A 2012 study identified an 11% cost increase using green building strategies, 2-day increases for project completion, and the return on their investment via long term energy cost savings (J. Kim, Greene, & Kim, 2014). Rehm and Ade (2014) included cost savings as a benefit related to the ROI and life cycle of green buildings.

The sustainable development process includes increasing the rate of energy savings without decreasing the business profit margin (El-Deep, Gouda, & El-Saadawi, 2014). Designing a building that merges environmental concerns and financial stability underscores the conundrum companies face when weighing the risk and rewards associated with the green business case (Figge & Hahn, 2012). Furthermore, using

sustainable principles improves productivity, community goodwill, and employee optimism (Ramirez, Gonzalez, & Moreira, 2014). Moreover, the return on the initial investment outweighs cost concerns related sustainability (Figge & Hahn, 2012). In 2008, DuPont invested $50M in their sustainable initiatives and received a return on that investment within one year (J. Cronin, Smith, Gleim, Ramirez, & Martinez, 2011). Anxiety and trepidation related to the green business case remains based on limited knowledge of the cost benefits associated with adopting innovative strategies (Kasai & Jabbour, 2014).

As of January 2011, growth in the residential construction sector increased 67% over the nonresidential sector (U. S. Census Bureau Construction Expenditures, 2014). Home improvement also reflected growth in residential construction. In 2011, the American Housing Survey (AHS) and the U.S. Census Bureau conducted a joint study related to home improvement projects (U.S. Census Bureau & U.S. Department of Housing and Urban Development, 2011). The AHS study results indicated of the 76.1 million residential renovation projects in 2011, only 10.4 million were energy efficient improvements (U.S. Census Bureau & U.S. Department of Housing and Urban Development, 2011). Creating a green building plan and satisfying environmental goals without compromising profits presents a challenge to design engineers, investors, and the construction industry (El-Deep et al., 2014). Success requires collaboration among stakeholders and knowledge sharing from the design process through project delivery (El-Deep et al., 2014).

Developing Energy Policies

More than 2 billion people do not have access to reliable energy to assist in domiciliary responsibilities and support business development (Grubler, 2012). More than 2.7 billion people need access to reliable energy to replace contaminated biomass sources with healthy alternatives (Bruce, 2013). The humanitarian and economic deficits attributed to lack of reliable power generating systems punctuates the need for policy consistency supported by research (Grubler, 2012).

In 1983, Iowa passed legislation designed to encourage developing alternative energy resources (Carley & Miller, 2012). In 2011, 37 states required power generation companies to develop alternative energy resources as part of their services (Carley & Miller, 2012). All states in the United States have regulations regarding energy efficiency (North Carolina Solar Center, 2013). However, Ahoobim (2009) suggested establishing policies governing power generation coupled with efficiency as a measurement for effective RPS policies.

Results from Roy, Ghosh, Gosh, and Dasgupta (2013) suggested a correlation between proactive public policies and engaging private sector investors. An additional study supported the notion that consistent, coordinated policies are necessary to mitigate uncertainty for investors and utility companies associated with fluctuating costs of fossil fuels (Wüstenhagen & Menichetti, 2012). Wüstenhagen and Menichetti (2012) also identified U.S. government assistance as a strategic mitigation component to create a predictable demand for the product or develop policies that give consumers an incentive to purchase and use renewable energy.

Social structures and environmental interests continue to create opportunities to expand renewable energy markets (Chao, 2011). Additionally, the familiarity and short-term financial benefits of nonrenewable energy sources frame complexities inherent in the transition phase and growth in the RE industry (Okereke, Wittneben, & Bowen, 2012). For example, government policies and subsidies help mitigate expense barriers created by the asymmetric renewable energy pricing formula and the higher cost in relation to fossil fuels (Fagiani, Barquín, & Hakvoort, 2013). However, a lack of coordinated policies the U.S. government incentives and subsidies might be costly, create competitive disparities in the private sector, and facilitate energy price increases (Ameli & Kammen, 2014). Therefore, politically motivated research and biased presentations interfere with policy discussions and deters some government support for renewable energy projects (Stokes, 2013).

Increasing energy independence and lowering consumer energy costs require tax incentives, abatements, and other policy instruments as means to ensure energy efficiency goals succeed (Barbose et al., 2014). Energy independence necessarily includes educating consumers regarding the exponential value added created through energy efficiency measures to complement renewable energy policies (Trianni, Cagno, & De Donatis, 2014). Additional opportunities exist for strategically positioned RE systems to increase market share based on sustainability and the potential environmental effect (Van Marrewijk, 2010).

The U.S. government policies must be coordinated to build a comprehensive energy strategy, or the policies create unintentional negative consequences with

regulation, taxation, and insufficient funding for RE research and development (Littlefield, 2013). Unpredictable changes in regulation, taxation, and irregular funding also contribute to residential builders' trepidation to include green construction as part of their profitability plan (Fagiani et al., 2013). Thus, developing effective energy policies include ways to decrease consumption and increase energy independence and security (Bang, 2010). Littlefield (2013) suggested the ambiguous language framing RE energy efficiency policies promotes system inefficiency because the long-term policies designed to reduce price and consumption, prevent market equilibrium, and increase price volatility to an already unstable industry.

Although energy policy proposals increase, the ongoing climate change debate, political posturing, and demagoguery hinder in depth discussion and passing energy policy proposals (Skodvin, 2010). Political gridlock notwithstanding, policies designed to increase renewable energy development typically include tax incentives (Menaker, Kershaw, Letherman, Scoon, & Ng, 2012). The 2005 Energy Tax Incentives Act included $14 billion in incentives to increase domestic production and primarily focused on ethanol (Tavallali, 2010). The American Recovery and Reinvestment Act of 2009 provided $420 billion tax incentives for renewable and nonrenewable energy products (Tavallali, 2010). When states and U.S. government entities face economic shortfalls, tax incentives for renewable and alternative energy resources become a casualty of budget cuts (Cosmo, 2011).

The stated goal for RPS legislation aims to reduce greenhouse gas emissions (Aslani & Wong, 2014). Energy independence provides additional impetus in developing

renewable energy policies (Littlefield, 2013). Accomplishing those two goals requires developing a robust energy policy that includes energy efficiency as part of the comprehensive plan (Houston, Gyamfi, & Whale, 2014). In a financially austere environment, energy efficiency provides an economically feasible method to achieve RPS goals with minimal financial investment or abatements (Houston et al., 2014).

Successful legislation includes instructional components and applicable recommendations gleaned from empirical science to frame a plausible construct for energy policy development (Mansfield & Wheaton, 2011). Effective legislation includes ontological and epistemological considerations regarding how empirical knowledge and abstract concepts influence legislative debates and policy development (Mackor, 2013). Policy makers often exclude information learned through rigorous research findings when developing energy policy.

The need to ground effective policies in empirical research requires legislators to understand the value in scientific research and the value added through social ontology (Mackor, 2013). Furthermore, energy independence and energy security tend to influence the prescriptive elements in energy policy (Moss & Kwoka, 2010). Nuanced prescriptive approaches and meandering solutions complicate opportunities to establish the relevance and role research has in energy policy development (Church & Ravenscroft, 2011).

The energy efficiency gap is the delta between policy intent and energy savings generated from policy implementation (Bukarica & Robić, 2013). The arbitrary characterization regarding research relevance and developing energy policies aside,

history and research remain important to evolving perceptions and understanding the nexus between current energy technology and transitioning to an environmentally aware and sustainable economy (Fouquet & Pearson, 2012). Results from a 2014 study indicated a need for more research regarding the how policies modify consumer energy demand in developed and emerging economies (Recalde et al., 2014).

Balancing energy supply and energy consumption persists as a challenge for every era of civilization (Solomon & Krishna, 2011). Utility companies and policy makers include energy efficiency measures as a strategic component to accommodate consumer demand and meet RPS goals as part of a robust energy plan (Barbose et al., 2014). Energy policies lack viable metrics to quantify results attributed to a multifocused approach within a comprehensive energy strategy (Holt & Galligan, 2013). Juxtaposing goals between state and U.S. federal policies create contradictory policies and decrease opportunities to develop energy policies that include energy efficiency, renewable resources, and carbon emission reduction (L. Holt & Galligan, 2013).

Comprehensive policy development requires expanding the legislative impetus for RPS beyond renewable energy. Additional measures include a plan to reduce energy waste from the public and private sector business, eliminate financial barriers, and expand the use of technological innovations as a method to increase energy savings (De Oliveira, Shayani, & De Oliveira, 2013). A comprehensive program that addresses carbon emission reduction and economically feasible for power generation companies requires diverse and complementary approach in energy discussions and policy opportunities (Haydt, Leal, & Dias, 2014). Haydt, Leal, and Dias (2014) suggested at

least four options as possible considerations for a multiobjective approach in energy policy development.

First, ratepayers and end users must become active stakeholders in the process through pricing policies designed to encourage ratepayers to adopt energy efficient lifestyles. Second, it is necessary to recognize the importance of power generation companies to use financial investments incrementally and develop a tiered policy approach for companies to meet RPS standards. Another consideration includes establishing trade off value for developing renewable energy resources and implementing energy efficiency programs. Finally, a comprehensive energy policy might use value cocreation between legislative bodies and utility companies to minimize financial investment cost with credits for innovative coupling of RE and EE programs.

Policies that limit direct carbon emissions increase efficiency standards, help achieve established RPS objectives, and facilitate the goal to reduce energy consumption (Calvin et al., 2014). Energy efficiency is more than theoretical, as businesses recognize the need to reduce carbon emission and contribute to energy independence for the United States (Moss & Kwoka, 2010). Making allowances for environmental concerns during the planning stages increases the integrated value by reducing costs and schedule delays for construction projects (Ahn & Lee, 2013).

Economists, environmentalists, political interests, military stakeholders, and stockholders provide context to the policy development narrative (Mercure & Salas, 2013). Contextual contribution aside, the same stakeholder group (economists, politicians, and policy makers) differ on climate change, energy sources, and ways to

reduce consumption, increase energy efficiency, and conserve diminishing nonrenewable energy resources (Bang, 2010). The debate regarding global warming and energy sources includes environmentalist and other business stakeholders. Examining previous trends indicates increased consumption and typically follows energy transitions, and increasing RE resources does not guarantee a reduction in fossil fuel dependence (Fouquet & Pearson, 2012).

Although trends for energy efficiency show vertical movement, uncertainty in quantifying potential savings through energy efficiency measures, programs, and results fluctuate across market subdivisions (Ahn & Lee, 2013). Information in environmental studies acknowledge a reduction in nonrenewable resources; however, researchers caution against using a one size fits all RE approach as the panacea to insulate economic growth and mitigate environmental degradation (Philibert, 2011). Ignoring the similarities between existing resource extractions and expanding alternative energy sources might recreate the paradigmatic scenarios represented by nonrenewable energy.

RES and RE technologies posed similar vulnerabilities in supply chain risks (Hensel, 2011). Additional challenges to RES and emerging sustainable development include limited access to all natural resources and geographic resource monopolies that might mirror the current challenges within nonrenewable energy markets (Hensel, 2011). Although energy security and energy efficiency discussions have political traction, one scholar suggested consigning energy power to OPEC is a myth that benefits Middle East producers through perceived international influence and political power (Colgan, 2014). More than 70 countries established policies to support RE transition objectives, decrease

dependence on oil, increase energy security, protect the environment, and build commerce opportunities that sustain their competitive advantage (Philibert, 2011).

Policy development does not happen in a vacuum; various social, political, and economic factors also influence legislation. In the 20th century, growing energy services provided an important factor for economic growth (Stern & Kander, 2012). In a 2011 study, Solomon and Krishna determined social, economic, and environmental sustainability hinges on transitioning to different energy sources. Increasing the adoption rate and transition to renewable energy resources reduces the negative CO2 effect on the environment (Solomon & Krishna, 2011). Conversely, a 2012 study compared 1,785 news articles over a 10-year period, showing how the media influences public knowledge, attitudes, and perceptions regarding global warming cause and effect (Shehata & Hopmann, 2012). If the media effect, through language manipulation, guides the push to RE development, the influence reduces the environmental argument to questionable at best (Littlefield, 2013). The media influence on policy justified by environmental concerns notwithstanding, legislators create policy and design de jure and de facto entities to carry out legislative intent (Mackor, 2013).

Policy considerations typically include ways to develop renewable energy resources such as geothermal, wind, hydro, and solar. Robust energy policies that include energy efficiency as a significant factor to increase policy effectiveness (Satchwell, Cappers, & Goldman, 2011). Although energy efficiency is the most cost effective means to reduce the collective carbon footprint, the myopic practice that relegates regulatory policy to incumbent energy utilities significantly reduces incentives,

cooperation, and cost benefits for energy companies (Brennan, 2013). Requiring the utility companies to shoulder the financial cost incurred for energy efficiency programs limits options for comprehensive sustainability planning for communities (Byrne & Taminiau, 2015). The monolithic paradigm also excludes options for diversified redirection of economic development within energy sectors (Byrne & Taminiau, 2015). The current business as usual (BAU) model contributes to the financial and technological barriers limiting home owners opportunities to consider energy efficiency options in residential renovation (Pettifor, Wilson, & Chryssochoidis, 2015). The BAU model, insufficient information for consumers, and ineffective marketing strategies that disregard the economic optimality link for residential patrons contribute to the stagnate adoption rate for energy efficient homes and appliances (Schubert & Stadelmann, 2015). Hence, policy makers should include increasing consumer awareness and economic incentives for utility companies to improve the access and adoption process for energy efficient homes, appliances, and programs (Schubert & Stadelmann, 2015).

Transitioning From Nonrenewable to Renewable Energy Resources

The energy consumption rate and cost are environmentally, economically, and materially unsustainable (Ahmad & Tahar, 2014). Energy efficiency facilitates a cost-effective transition from the 20th century fossil fuel economy to economic growth through renewable energy (Bukarica & Robić, 2013). The environmental argument is a general political refrain used to promote energy independence and efficiency, yet the international political economy perspective excludes energy from the academic construct

in some policy disciplines (Keating, Kuzemko, Belyi, & Goldthau, 2012). Legislation is one way to improve energy sustainability (Ahoobim, 2009).

Eco scientists advance the theory that comprehensive planning, conservation, and RE expansion yield $1.2 trillion gross energy savings for the U.S. economy by 2020 (Allcott & Greenstone, 2012). A need exists to transition to RE resources and develop energy efficiency policies (Brunnschweiler, 2010). However, the transition from nonrenewable energy resources to RE resources presents several challenges. For instance, the familiarity and short-term financial benefits of nonrenewable energy sources frame complexities inherent in the development phase and growth in the renewable energy industry (Okereke et al., 2012).

Political consensus, consumer popularity, and scientific consensus need to support policies to facilitate the transition from fossil fuels to renewable energy (Fischer & Preonas, 2010). Comprehensive planning and coordinated U.S. government polices minimize unintended negative consequences related to regulation, taxation, and insufficient funding for RE research and development (Littlefield, 2013). Regulation, taxation, and funding RE research and development might contribute to residential builders' trepidation to include green construction as part of their profitability plan (Fagiani et al., 2013).

Although energy policy proposals increased, the ongoing climate change debate political posturing and demagoguery hinder in depth discussion and passing energy policy proposals (Skodvin, 2010). In a knowledge economy, the ability to use innovation and sustainable development requires leaders to understand knowledge as a resource in

strategic planning (Lengnick-Hall & Griffith, 2011). Exploring the information residential builders need to understand the cost benefits of building green is a means to increase builders resource knowledge for strategic planning.

Justification for a Qualitative Case Study

Research methods include qualitative, quantitative, and mixed methods as techniques to test hypothesis or address phenomenon and understand various live patterns (Wahyuni, 2012). Qualitative studies include several designs approaches that provide flexibility and opportunities for in depth discussions regarding lived experiences (Logie-MacIver, Piacentini, & Eadie, 2012). Qualitative research includes ethnography, narrative analysis and inquiry, phenomenology, grounded theory, and case study as the five design approaches (Chenail, 2011). The phenomenological design extrapolates what and how from events, experience, and commonalities to explain the fundamental nature of those events in the universe and fits the research goals for this project (Lahlou, 2011). Ethnographic research requires the researcher to become part of the cultural context, interact with the members of the defined group, and see the activities through the same social lens to understand how the culture functions (Johnston, 2010). In narrative studies, the researcher focuses on folk stories providing a method of articulation for individuals, groups, and marginalized communities to account for activities and events in their lives (Larsson & Sjöblom, 2010).

Ontology and epistemology cover two important philosophical research dimensions within research method and designs (Wahyuni, 2012). Ontology is the philosophical dimension used to express the essence of the experience studied as part of

the research agenda, and epistemology explains origins of known information related to the experience studied in the research agenda (Raadschelders, 2011). Answering the research question regarding benefits associated with green building includes ontological (how) and epistemological (what) aspects within construction project design and management protocols (Pezic, 2012). The quantitative research approach is not appropriate because the process tests hypotheses and evaluates the numeric outcomes identified in the research; furthermore, quantitative methods lack the flexibility to explore business processes through participant lived experience (Acosta, 2012).

Construction waste harms the environment, increases cost, and decreases productivity value (Nagapan et al., 2012). Pezic (2012) identified 81 different factors responsible for construction waste. The qualitative research approach facilitates a forensic exploration related to building processes from design to delivery as a way to reduce material waste and increase cost efficiency within the construction industry (Nagapan et al., 2012). A qualitative case study also provides the best design to explore policy instruments, consumer behavior, and technical interventions to improve profit incentives for energy efficiency programs (Judson & Maller, 2014).

Qualitative methods include the discipline based approach, policy research approach, the critical qualitative approach, and current issues approach as pedagogical constructs (Denzin, 2009). The qualitative method is an interdisciplinary research approach and the intersection of the lived experiences and decision processes provides a construct to discover the business knowledge need to build green homes (Merriam, 2014). The discipline based approach provides a framework for the researcher to focus

on acquiring basic knowledge regarding collective business processes and appropriate for the exploration aspects within this study (Denzin, 2009). The qualitative method provides a system to discover knowledge sharing channels in residential construction used to diffuse information related to the financial and supply chain processes involved in building green homes (Burns, Acar, & Datta, 2011).

The qualitative interview construct incorporates various inquiry techniques including informal conversation interview, general interview guide approach, as well as standardized open-ended interview (Gall, Gall, & Borg, 2003 as cited in Turner, 2010). The informal, conversational and general interview designs provide flexibility for the researcher and more subjective interaction with study participants (Lehner, 2015). The standardized open-ended interview provides process structure, flexibility for participants, and to use objectivity during data analysis identify and calculate emerging themes (Crawford et al., 2014). Anyan (2013) posited the notion that transactional power dynamics precludes structured and semistructured definitions when describing the qualitative interview process. Transactional power dynamics describes the interplay between the interviewer and participant as each uses countermeasures to balance the power asymmetry present during the data collection process (Anyan, 2013). The purpose of this research is exploratory and does not require testing hypothesis and variables to determine statistical outcomes thereby eliminating the quantitative method as a research procedure for this study.

Using the Telephone as a Data Collection Technique

In a 2012 study Block and Erskine suggested the notion that telephone interviews improve research efficacy when using a purposeful sampling approach and when the research technique uses open ended questions to increase a specific body of knowledge (Block & Erskine, 2012). Although telephone interviews provide a convenience for participants and longer access for the researcher, the telephone interview eliminates opportunities for visual cues (Irvine, Drew, & Sainsbury, 2013). Shaw, Scully, and Hart (2014) suggested the benefits associated with spontaneity and decreased interviewer influence achieved with telephone interviews outweigh disadvantages related to the interviewer's ability to observe nonverbal cues. Cost effectiveness, anonymity in explaining personal experiences, and convenience outweigh the perceived data distortion generated by the lack of visual cues present in qualitative research using telephone interviews (Allen, 2014).

Opdenakker (2006) acknowledged the benefits associated with observing nonverbal cues included in face-to-face interviews; the study conclusions indicated the disadvantages are relative depending on the researcher's objectives. Although telephone interviews may eliminate visual information regarding the physical setting and nonverbal responses, careful listening and asking clarifying questions mitigate those disadvantages (Drabble, Trocki, Salcedo, Walker, & Korcha, 2015). The results of a 2004 study, indicated using telephone interviews as a data collection tool enhances qualitative research (Sturges & Hanrahan, 2004). Amerson (2011) advocated using multiple sources for data collection including interviews, direct observation, photographs, videos, and

archived documents. Casey and Murphy (2009) suggested using more than one data collection method within the same research design to accomplish within methodological triangulation. The interviews, response verification, field notes from direct observation at an active building site and document analysis provide a foundation to integrate within methodological triangulation as part of the construct validity and reliability process for this study. The purpose of the direct observation at an active residential building site assist in collecting data related to the building process and a completed residential building product as presented to the potential homeowner (end user) and the validating interview responses using the within methodological process.

Innovation in Product Development and Consumer Adoption

Innovation categories include continuous, discontinuous, business model, and open innovation each managed in different ways according to the company's strategic intent (Jarvenpaa & Wernick 2012; Morris, 2013). Placing an *innovation* label on an idea or product does not guarantee marketing or adoption success (Greve, 2011). Continuous innovations help maintain industry status quo, whereas successful discontinuous innovations creates a competitive advantage for businesses (Morris, 2013). For the purpose of this research paper, the topic to discuss is open innovation networks as an intentional communication method using knowledge to strengthen core innovation processes as a strategic tool for modernization and market expansion (Jarvenpaa & Wernick, 2012). Organizations might use innovation as a tool to facilitate positive social impact and as a strategy to gain or increase their competitive advantage (Greve, 2011).

Generous profit margins aside, innovation and change are necessary to ensure company relevance and sustain a competitive advantage (Ding & Peters, 2000).

Anticipated benefits notwithstanding, change is a daunting process (Leavy, 2011). Industry leadership is fluid and changes over time as complacency creates myopic planning that excludes product evolution, changing consumer priorities, and emerging technologies (Hippie, 2012). Complacency in established companies jeopardizes their competitive advantage enabling new entrants unobstructed opportunities to compete with parody (Hippie, 2012). Moving beyond mediocrity involves a philosophical shift in strategy from an agenda driven by current products to paradigm focused on the external product evolution anticipating consumers' needs (Petrick & Martinelli, 2012). Identifying the organization's strategic frontier demonstrates an initial commitment to innovation and change (Bate, 2010).

Innovation is a dynamic process and includes two development types; industrial product innovation and consumer product innovation (Ogawa & Pongtanalert, 2013). Industrial product innovation represents the traditional paradigm for product development; more companies recognize the benefits of consumer product innovation as a means to relevancy and expeditiously advancing the adoption process (Bogers, Afuah, & Bastian, 2010). Consumer innovators as a concept includes community and independent innovators as sub categories with different characteristics accomplishing product innovation (Ogawa & Pongtanalert, 2013). Consumers offer a unique perspective to the development process. As an exogenous element within the development and marketing processes provide manufacturers important feedback

essential in designing a successful marketing campaign (Bogers et al., 2010). Feedback is foundational and instructive method to provide diagnostic and prescriptive advice regarding a product, action, or service (Millward, Asumeng, & McDowall, 2010). Feedback is an important aspect during the development, marketing, and adoption process for new products (Millward et al., 2010).

Ogawa and Pongtanalert (2013) published research results identifying characteristics found in consumer innovators. Quantitative methods and surveys were used as the design for the study (Ogawa & Pongtanalert, 2013). The longitudinal study began in March 2011 and ended in May 2012 with participants from the United States, Japan, and the United Kingdom. Although demographically similar, the results revealed stark differences in motivation and behavior between the two groups (Ogawa & Pongtanalert, 2013). Community innovators shared information with other members of the community and established collaboration and partnership opportunities.

Conversely, independent innovators worked in solitary settings without the benefit of collaboration, information exchange, and strategic plan to market their innovation (Ogawa & Pongtanalert, 2013). The community innovators' group had fewer members, yet provided the best value added to their organizations regarding process integration throughout the supply chain, predicting the market size and the consumer adoption rate (Ogawa & Pongtanalert, 2013). Five fundamentals influence organizational change: (a) globalization, (b) changing technology, (c) regulation, (d) stakeholder actions, and (e) the eroding of business boundaries (Mentzer, Myers, & Stank, 2007). Innovation

provides synergy among the fundamental elements required for organizational change (Petrick & Martinelli, 2012).

Shofoluwe, Ofori-Boadu, Waller, and Bock-Hyeng (2012) used a survey as the data collection instrument to explore the business, and quality improvement practices to create a competitive advantage in the residential construction industry in North Carolina. The researchers identified quality improvement practices and core business processes as strategies for brand differentiation and increasing their competitive advantage (Shofoluwe et al., 2012). Green construction is another strategy used in brand differentiation and building a competitive advantage (Elliott, 2013).

Diffusion of Innovation Theory

Continuous improvement remains a significant precept for businesses and entrepreneurial sustainability in the 21st century (Shiller, 2013). Using innovation as a business strategy requires a balanced concentricity process to identify immediate and emerging product opportunities and as a pedagogical instrument helps entrepreneurs learn to use innovation as a strategic tool of capitalism (Shiller, 2013). Although continuous improvement through innovation precipitates change; effective innovation requires strategic marketing encouraging consumers to adopt the new technology, service, or product (Petrick & Martinelli, 2012). In this qualitative case study, the theme addressed the diffusion of innovation (DOI) theory as an applied concept for the interpersonal communication process between consumers by which products, services, and ideas progress from inception to adoption (Im & Ha, 2012). Although defined as a scientific phenomenon, Roger's diffusion of innovation theory encompasses social network

processes (Rogers, 2010). As a rubric, the DOI offers a useful paradigm to describe characteristics common among innovators and early adopters (Ogawa & Pongtanalert, 2013).

Rogers' (2010) DOI frames the adoption process through social and cultural constructs (Ratcliff & Doshi, 2013). Rogers developed an *S shape curve* as the theoretical construct to show the adoption trajectory and suggested a sharp vertical line indicated rapid adoption and a flat curve represented slower adoption time (Heath, 2005). According to Rogers (1995), perceived attributes, relative advantage, compatibility, complexity, and trialability influence the social adoption process while communication methods, social values, and change agents influence cultural drivers for the DOI theory (Ratcliff & Doshi, 2013). Rogers' DOI theory provided a comprehensive approach to this study because it incorporates theories of Technology Acceptance Model (TAM), provided a research context for social networks, cultural values, current methods, and prevailing views regarding traditional versus green innovations within the residential construction industry (Woodward et al., 2014).

In addition to providing a context to study the adoption process, Rogers' DOI theory includes a calculus for decision makers relative to new ideas, products, and services (Ratcliff & Doshi, 2013). The consumer adoption process varies between the local and global marketplace. The basic tenets within the innovation decision making model are constant (Kotler & Keller, 2009). Rogers's innovation decision model includes knowledge, persuasion, contemplation, implementation, and decision confirmation (Woodward et al., 2014). The decision process for DOI extends beyond

positive innovation streams and includes disappointing innovations as well (Greve, 2011). Organizations involved in strategic planning often use disappointing innovations as part of the forensic analysis process for integration, implementation, and to identify difficulties and other complications relating to a business or communication process (Greve, 2011).

Bass (2013), another DOI research scholar, used innovation parameter and the imitation parameter as juxtaposing factors observe the longitudinal adoption characteristics and context for Rogers' five-step process (Ratcliff & Doshi, 2013). Researchers typically use DOI as a qualitative tool to describe and explore the adoption process without resolving conflict issues with improvement, accessibility, and time commitment to the learning curve (Ratcliff & Doshi, 2013). More than four billion people in emerging economies have annual incomes of $1,500 or less, and lack access to international markets, and products or services that improve their quality of life (Esko, Zeromskis, & Hsuan, 2013). Societies with a per capita income of less than $2 a day comprise the bottom of the economic pyramid (BoP) and provide fertile opportunities for business expansion (Ramachandran, Pant, & Pani, 2012).

The goals of the Bass (1969) model offers a mechanism to quantify the correlation between negative and positive events related to the time, trajectory, and the adoption rate for low income consumers and those living at the bottom of the economic pyramid (Ratcliff & Doshi, 2013). Roger's DOI theory includes communication systems and interactive behavioral process as shown in a complex adaptive system's model incorporating time and social systems that create an agent based model for the theory

(Nan, Zmud, & Yetgin, 2014). Diffusion of innovation supports communicating the various steps in the adoption process; the focus on a single product or idea limits utility in dynamic industries such as information technology. The knowledge-based model of radical innovation bridges the utility gap (Carlo, Lyytinen, & Rose, 2012). Radical innovation is unique and novel based on perpetuating new knowledge channels to create new technologies (Carlo et al., 2012). Kesharwani and Bisht (2012) noted the absence of trust and perceived risk, and consumer vulnerability to duplicitous practices as extant factors in the adoption process.

Kesharwani and Bisht (2012) used the technology acceptance model (TAM), quantitative methods, and questionnaire design. The authors sent 1,050 questionnaires to student and received 740 responses (Kesharwani & Bisht, 2012). The research goals included identifying consumer perceptions regarding simplicity, usefulness, perceived behavioral control, social influence, and how behavioral intention affected consumer adoption in internet banking (Kesharwani & Bisht, 2012). Their findings revealed a correlation between consumer confidence, perceived risk, and willingness to adopt new technologies (Kesharwani & Bisht, 2012).

The traditional innovation paradigm includes continuous and discontinuous innovation (Ratcliff & Doshi, 2013). Morris (2013) explored *business model innovation,* an emerging archetype that transforms organizations at the business process. Morris used business model innovation to define the strategic process that incorporates customer feedback, anticipates industry changes, incorporates anticipated changes into their strategic frontier, and uses differentiation as a tool to increase bottom line profits (Morris,

2013). Customer feedback is a significant component and accelerates the adoption process (Ogawa & Pongtanalert, 2013). The business model innovation construct has utility as residential builders explore sustainable development using green building systems (Mokhlesian & Holmén, 2012). The interactive potential embedded within the business model innovative facilitates networking through collaborative communication, the ability to capitalizing on external resources, provides opportunities for knowledge synergy, thereby creating the conditions necessary for sustainable growth and economic development (Ahrweiler, Gilbert, & Pyka, 2011).

The adoption process provides the contextual underpinning for the DOI theory (Kaminski, 2011). The ability to innovate and incorporate continuous improvement processes are significant factors in building and sustaining a business' competitive advantage (Huang, Kao, Chang, & Lin, 2012). Apple used business model innovation platform to revolutionize the organizations' business management processes to increase and sustain their competitive advantage and revolutionized the technology industry (Jun & Park, 2013). Southwest Airlines and Netflix are also business models for innovation (Lin, Huang, Chang, & Kao, 2012). Southwest Airlines uses differentiation in their business process and leads the airline industry in market share (Rietsema & Watkins, 2012). Netflix used direct download to transform and shorten the supply chain for in home movies and is the largest internet based movie company in the world (Feuerverger, He, & Khatri, 2012). In the construction sector, the diffusion of innovation theory provides a construct to maximize productivity and efficiency (Harty, 2010).

Transitioning From Nonrenewable to Renewable Energy Resources

The energy consumption rate and cost are environmentally, economically, and materially unsustainable (Ahmad & Tahar, 2014). The environmental argument is a general political refrain used to promote energy independence and efficiency, yet the international political economy perspective excludes *energy* from the academic construct and in some policy disciplines (Keating et al., 2012). Legislation is one way to improve energy sustainability (Ahoobim, 2009).

In 1983, Iowa passed legislation designed to encourage developing alternative energy resources (Carley & Miller, 2012). In 2011, 37 states required power generation companies to develop alternative energy resources as part of their services (Carley & Miller, 2012). All 50 states have regulations regarding energy efficiency (North Carolina Solar Center, 2013). Ahoobim (2009) suggested establishing policies governing power generation coupled with efficiency as a measurement for effective RPS policies.

Another study in 2013, indicated a correlation between proactive public policies and engaging private sector investors (Roy, Ghosh, Ghosh, & Dasgupta, 2013). An additional study supported the notion that consistent, coordinated policies are necessary to mitigate uncertainty for investors and utility companies associated with fluctuating costs of fossil fuels (Wüstenhagen & Menichetti, 2012). Wüstenhagen and Menichetti (2012) also identified U.S. government assistance as a strategic mitigation component to create a predictable demand for the product or develop policies that give consumers an incentive to purchase and use renewable energy.

U.S. government policies might create unintentional negative consequence with regulation, taxation, and insufficient funding for RE research and development (Littlefield, 2013). Regulation, taxation, and funding RE research and development might contribute to residential builders' trepidation to include green construction as part of their profitability plan (Fagiani et al., 2013). Energy policies aim to decrease consumption and increase energy independence and security (Bang, 2010). Littlefield (2013) suggested the ambiguous language framing RE policy promotes system inefficiency because the long-term policies, designed to reduce price and consumption, prevent market equilibrium increasing price volatility to an already unstable industry.

Although energy policy proposals increased, the ongoing climate change debate political posturing and demagoguery hinder in depth discussion and passing energy policy proposals (Skodvin, 2010). Political gridlock notwithstanding, policies designed to increase renewable energy development typically include tax incentives (Menaker et al., 2012). The 2005 Energy Tax Incentives Act included $14 billion in incentives to increase domestic production and primarily focused on ethanol (Tavallali, 2010). The American Recovery and Reinvestment Act of 2009 provided $420 billion tax incentives for renewable and nonrenewable energy products (Tavallali, 2010). When states and U.S. government entities face economic shortfalls, tax incentives for renewable and alternative energy resources become a casualty of budget cuts (Cosmo, 2011).

The stated goal for RPS legislation aims to reduce greenhouse gas emissions reducing GHG as a stated goal for RPS legislation (Aslani & Wong, 2014). Energy independence provides additional impetus in developing renewable energy policies

(Littlefield, 2013). Accomplishing those two goals requires developing a robust energy policy that includes energy efficiency as part of the comprehensive plan (Houston et al., 2014). In a financially austere environment, energy efficiency provides an economically feasible method to achieve RPS goals with minimal financial investment or abatements (Houston et al., 2014).

Leadership as Innovation

Change often includes periods of unproductive activity by persons opposing status quo changes (Leavy, 2011). Although counterintuitive, Leavy (2011) suggested adaptive leadership and cognitive dissonance to challenge the resistance and manage the organization's disequilibrium process. Adaptive leadership is one method to facilitate innovation among the management team (Leavy, 2011). Effective leadership includes the ability to understand existing challenges and know how to leverage vision, transactional analysis and interpersonal relationships to solve organizational challenges (Leavy, 2011). During periods of challenge and change, effective leaders know how to inspire their employees to accomplish organizational goals with excellence (Savage-Austin & Honeycutt, 2011).

In the construction industry, inadequate information, ambiguous definitions for energy efficiency, and leveraging new information regarding technological advances create a challenging environment for voluntary energy efficiency programs (Peterman, Kourula, & Levitt, 2012). Economic incentives produce marginal results indicating the need for additional measures to stabilize the cost and create shareholder value (Peterman et al., 2012). Transforming barriers into economic drivers for voluntary participation in

energy conservation programs requires closing the knowledge gap among consumers, innovative leadership among project designers and managers, along with coordinated public policy (Peterman et al., 2012).

Tangible objectives in policy development include environmental and social goals. Leaders of small and medium enterprises (SMEs) fail to incorporate green practice, such as life-cycle analysis (LCA), because of a lack of resources and insufficient information on how to integrate such practice into the work stream. Research on environmentally sustainable practice within SMEs is minimal, and business leaders do not possess a clear understanding of how to link the implementation of green practice to their bottom line cost.

Businesses leaders that implemented sustainability practices during the 2005-2009 economic downturn used the CSR through sustainability as a method to maintain their competitive advantage (Barnett, Darnall, & Husted, 2015). Barnett et al. explored opportunities to implement LCA into a SME. The research included a qualitative case study, based on Epstein's theoretical framework of corporate sustainability conducted within a SME. The primary research question involved identifying the steps necessary to implement sustainable practice using LCA. The research process included coding and analyzing data collected from a purposeful sample of 11 structured interviews, direct observations, and document review.

Emergent themes described in the presentation of the findings highlight the lack of incentives for employers and employees to participate in green practices, the need for education, and the opportunity for SMEs to form partnerships with general contractors in

the construction industry. These themes addressed opportunities for improving environmental management systems at the SME, and documented the steps necessary to implement LCA. This research provided the foundation to develop the LCA and a comprehensive examination of the ecological aspects of selected processes at the case-study site.

Implications for positive social change include opportunities for leaders to integrate green methods such as LCA into business operations (Barnett et al., 2015). Integrating green methods into the company's CSR improves their corporate reputation among eco consumers and provides a tool for strategic alignment between corporate business processes and environmental imperatives (Amato, Zillante, & Amato, 2015). Planning cannot come to fruition if the policy climate does not support environmental protection efforts (Brennan, 2013). Developing public and private alliances provide the stakeholder participation necessary to influence policy decisions relating to green industries (Gibbs, 2012).

Sustainability is within the grasp of every corporation, and every company has an opportunity to lead their industry (Metcalf & Benn, 2013). Sustainability as a business strategy incorporates community outreach, work-life balance and environmental management programs (Azzellino, 2011). Using environmental awareness as a sustainability strategy improves a company's reputation and increases profitability (Paquin, Busch, & Tilleman, 2015).

Leadership is perhaps the most important factor to create and maintain an environment of sustainability (Metcalf & Benn, 2013). In a knowledge economy,

innovative leadership might be the difference between mediocre successes and a sustainable competitive advantage (Metcalf & Benn, 2013). Understanding the strategic fit is also a critical component in developing the appropriate organizational climate for innovation (Carmeli, Gelbard, & Gefen, 2010). Although research regarding external fit (organization and external stakeholders) emerging research includes internal fit as part of the structural fundamentals linking intra-organizational dynamics and personal relationships (Carmeli et al., 2010).

Change challenges the organizational infrastructure regardless of the anticipated benefits associated with the change as a process (Leavy, 2011). Innovation diffusion theories lack effectiveness and focus without correspondingly bold and dynamic leadership (Uhl-Bien, Marion, & McKelvey, 2011). Innovative leadership differs from the leadership model for the industrial age (Uhl-Bien et al., 2011).

Jones (2013) demonstrated a correlation between leadership and profit. Building green within the construction industry requires changes throughout the process from design, site selection, land use, supply chain partners, and product delivery (Farahat & Emad Bakry, 2012). Coupling energy efficiency programs with policies to reduce GHG increases the net ROI beyond the economic investment costs (Knittel, Greenstone, & Carlos, 2014). For residential builders, maximizing partnerships, customer oriented solutions, and innovative leadership also improves their supply chain operations and increases their competitive advantage (Halman & Voordijk, 2012).

Transition and Summary

Section 1 was an introduction to energy resources, sustainable development policies, and how residential builders use green building practices as part of their business model. My research goals for Section 1 of this study established a logic based foundation to explore information residential builders need regarding the benefits of building green homes in a cost effective manner and remain profitable. The section began with an overview of renewable energy and energy efficiency and background of the problem that benefits attributed to building green include reduced operating cost, increased productivity, enriched image as a socially responsible corporate partner and reduced regulatory risks (Fuerst, 2009). The review of academic and professional literature included the topics of renewable energy price determinants, consumption and military operations, energy efficiency policies, diffusion of innovation theory, leadership, and transitioning from fossil fuels to renewable energy resources.

Building a competitive advantage includes strategic moves and movement as a strategic tool (Mentzer et al., 2007). Brand differentiation is one method to show product uniqueness in the industry and an essential component of developing smart targeting in marketing campaigns (Romaniuk, 2012). Brand differentiation, as a strategic tool, has horizontal and vertical dimensions (Makadok & Ross, 2013).

Horizontal differentiation moves the product away from competitors mass appeal and closer to *boutique* consumers, while vertical differentiation moves the product into a different value classification potentially appealing to all consumers (Makadok & Ross, 2013). Low cost leadership, product differentiation, customer focus, and vertical

integration are elements used in building an organization's *sustainable value framework* (Mentzer et al., 2007). Building green provides benefits for the environment and is useful as a differentiation strategy (Elliott, 2013).

Sustainable development is one differentiating factor available to residential construction companies to build a competitive advantage within their industry, account for consumers' environmental concerns, and reduce building costs (Leandro & Neffa, 2012),. During the 2009 recession, job vacancies average higher than unemployment rates and labor analyst use the Beveridge curve to show the negative correlation between unemployment and available job openings (Weidner & Williams, 2011). The anemic economic recovery reflects the slow employment growth within the construction industry (Barnichon, Elsby, Hobijn, & Rahin, 2012).

From an economic development perspective, a positive correlation exists between employment stability and growth within the construction area using the Beveridge curve measurements (Hobijn & Şahin, 2013). Improving industrial energy efficiency with robust and comprehensive energy policies (including conservation goal) help to reduce the industrial energy intensity (Houston et al., 2014). Expanding the information regarding case study method, the analytical approach for this study, and research strategies to explore information residential builders need regarding the cost benefits associated with building green homes provides the foundation for Section 2 in this study.

Section 2: The Project

In this research study, the topic discussed in Section 1 included the background, purpose, review of existing literature, qualitative method, and research design. The information in Section 2 expands on the study details through purpose restatement, providing an explanation regarding the researcher's role, and describes participant selection. Section 2 includes research method and design, population sampling requirements, and details for ethical parameters included in this study. The contents of Section 2 cover data collection instruments and data organization and analyze the central research question: What information do residential builders need regarding the cost benefits of building green homes? Finally, information in Section 2 includes a description of the reliability and validity elements in the research as well as a summary of key points in the study and provides an overview of Section 3 components.

Purpose Statement

The purpose of this qualitative exploratory case study was to discover the information residential builders' need regarding the cost benefits of building green homes. Eleven residential builders from Nevada and The National Association of Home Builders participated in semistructured interviews to share their experiences and perceptions of building green homes. I used participant observation, direct observation at a new residential development using green building techniques for energy efficiency, corporate web sites, brochures, and a review of archive records to demonstrate methodological triangulation. This research and study findings might affect business practice by providing residential construction companies an additional tool in developing

a long-range strategy to increase their competitive advantage (Morris, 2013). The implication for positive social change includes providing information resources to SME residential construction companies regarding the benefits associated with building green homes (Bouglet et al., 2012). Building green homes using sustainable development precepts helps increase economic growth opportunities associated with the construction industry, conserve natural resources, and reduce GHG emissions (Rehm & Ade, 2013).

Role of the Researcher

In qualitative data collection, the researcher is the primary instrument in the data collection process (Pezalla, Pettigrew, & Miller-Day, 2012). I was the primary data collection instrument. In the interest of full disclosure, as a State Senator, I have connections with various professional associations and interact with several constituent groups to draft and enact regulatory requirements for industries operating in the state of Nevada as part of senate legislative responsibilities. Professional associations germane to this study include executives at the NHBA in Washington, D.C., residential builders and general contractors in Nevada, managers for power generation companies, rural electric cooperatives, and people representing various industries in their role as government affairs executives.

Research responsibilities began with a literature review to develop the scholarly corpus for this doctoral study; additionally, I was the primary data collector, organizer, and interpreter for this study. The research role continued with the responsibility to present the research findings and recommend areas for further research related to building green homes in the residential construction sector. An interview protocol with open-

ended questions provided the exploration platform that facilitated collecting the information residential builders need regarding the benefits of building green homes in a cost effective manner (Jacob & Furgerson, 2012).

In March 2013, fulfilling the requirement in the *Sustainable Solutions Seminar* required a telephone interview with the vice president for a local Nevada residential building company. Although the company has a national presence within the United States, the participant represented one local homebuilder within Nevada. During the 2013 Nevada State Legislative Session, all state senators considered policy action regarding renewable energy, ratepayer protocols, and communications with the state regulatory commission. Information in the Belmont Report (1979) provided a template for beneficence and using information, comprehension, and voluntariness as criteria for informed consent (U.S. Department of Health and Human Services, 1979). In compliance with those standards, the preinterview protocol included a detailed informed consent form (see Appendix D). Literature exploration related to energy, energy efficiency, and renewable energy figured prominently within this research endeavor. Ethical reasons exclude Nevada Energy employees and their lobbyist from this study.

The interview protocol information is necessary to guide the researcher in developing the interview script, defining the parameters for questions and responses, and as a reminder to obtain informed consent from all participants (Jacob & Furgerson, 2012). Although scientific principles guide research methods, research is not value neutral (Fassinger & Morrow, 2013). A researcher's attitudes, ideals, philosophical nuances, and world view frame the literature selection and review, design, data

collection, and analysis expressed in the study (Fassinger & Morrow, 2013). Bias could occur during any stage of research, and the researcher must remain aware of personal prejudices that might influence participant responses and data analysis (Malone, Nicholl, & Tracey, 2014). Prior to the data collection stage, I held a bias toward expanding renewable energy as the preferred method to achieve RPS goals. However, analyzing the data and comparing participant responses to articles related to lowering consumer costs through energy efficiency standards mitigated some personal biases. The additional personal knowledge assisted in developing an attitude toward a comprehensive approach to energy strategies for businesses and government entities. Eliminating biases to the extent possible ensures validity when interpreting participant responses. Active listening through summarizing responses and asking clarifying follow up questions provided another bias mitigation strategy (Drabble et al., 2015). Working through the data collection process using prepared interview protocols assisted in mitigating the influence related to personal biases (Malone et al., 2014).

Biases might create an imbalance of power in an interview based on social, economic, or ethnic characteristics resulting in the interviewer controlling the questions and participant's responses (Anyan, 2013). Absent formal interview training, deliberate mindfulness provides a caveat to minimize bias and mitigate subjective influence during the qualitative interview (Pezalla et al., 2012). An additional measure to guard against unintended bias included recognizing personal biases through heightened mindfulness to minimize the influence during the interview, interpretation, and analysis processes (Marshall & Rossman, 2010). Mitigating real or perceived power imbalance included

asking participants to use my first name as a way to emphasize the informal interview aspects. A researcher has an obligation to report the study finding in an unbiased way to improve veracity and validity (Amerson, 2011).

Participants

The purposive sample size of 11 residential builders fulfilled the data collection requirements and enabled the extraction of meaningful data for this qualitative case study (Millward, Asumeng, & McDowall, 2010). Bewley and Schneider (2013) suggested professional responsibility, executive accountability, and the participant's level of financial investment amplifies their insight related to business processes and competitive strategy. Eleven executives, representing residential builders with more than 5 years experience from NAHB provided the participant pool for this study. In an effort to gain support for this study, the SNHBA and BANN executive directors and the NAHB assistant vice president for sustainability and green building received a brief summary regarding the general study goals and agreed to allow their members to participate in this study. Strategies to establish a working relationship with participants included sending an invitation letter to members who met the participant criteria, and once they agreed (see Appendix C), disclosing information regarding my personal interest in the research topic prior to the telephone interview.

Although the participant job titles varied, each person had operational decision responsibilities within his or her organization. The purpose of the research interview questions included collecting demographic information to ensure participants were qualified to participate in the research and gain insight about study participants' opinions

related to building green homes (Jacob & Furgerson, 2012)). The interview process provided an opportunity to gain in depth information regarding the participants' professional experiences and their views pertaining to building green homes (Owen, 2014). Establishing interview protocols and procedures are important to mitigate bias, ensure reliability, and repeatability for future research (Jefferies, Brewer, & Gajendran, 2014). Preparatory protocols included obtaining permission before starting data collection; identifying the steps to take before, during, and after each interview; and developing questions designed to gain information regarding the benefits of building green as described in Section 1 of this study (Jacob & Furgerson, 2012).

Research Method and Design

The research method for this study was a qualitative case study design. The exploratory characteristics associated with qualitative method supported the research aim to explore current business practices, identify distinct trends within the home building industry, and discover the information residential builders need regarding the cost benefits of building green homes (Adetutu, 2014). Business scholars and practitioners recommend the case study design as an effective research strategy to gain in depth knowledge of a phenomenon and understand the issues within the context of real life experiences (Crowe et al., 2011). Business knowledge was the topic for this research; for that reason, a qualitative case study was an appropriate method and design for this study (Yin, 2012).

Method

The qualitative paradigm facilitated evolving concepts and emerging themes during the data collection process to answer the overarching research question (Ogawa & Pongtanalert, 2013). The construction industry experiences the highest percent of business failures each year (Bal, Cheung, & Wu, 2013). Limited research exists regarding a comprehensive approach to determine the financial health, business survivability, and the triple bottom line (TBL) for residential builders using energy efficiency and building green strategies (Bewley & Schneider, 2013). The purpose of qualitative research was to find meaning and understanding through exploratory and diagnostic instruments to discover information related to the cost benefits of building green homes (Kapoulas & Mitic, 2012).

Qualitative research blends planning and discovery as a way to explain events within the context of social phenomena (Reybold, Lammert, & Stribling, 2013). The quantitative research approach incorporates standardized processes and statistical outcomes to increase rigor and research credibility (Gibbert & Ruigrok, 2010). Quantitative methods also use random sampling and numbers as a strategy to accomplish the research goal (Reybold et al., 2013). Conversely, qualitative research uses purposive sampling to glean information regarding life experiences within the context of a particular phenomenon and purposive sampling as a strategy tool (Reybold et al., 2013). The mixed methods approach includes qualitative and quantitative approaches (Green et al., 2014). Qualitative research provided a focused approach in answering the overarching research question and preserved the contextual fluidity and dynamism

necessary to identify emerging themes from participant responses regarding building green homes (Gibbert & Ruigrok, 2010).

The exploratory characteristics embedded in qualitative research yield in depth knowledge of a phenomenon and frame the criticism that interpretive research is controlling and lack rigor (Kapoulas & Mitic, 2012). The abstract nature of qualitative research presents empowerment opportunities, not manipulation, for participants, researchers, and readers to contribute to knowledge creation regarding the research question (Nite & Singer, 2012). A qualitative case study using discussions and interviews provided the best option to determine cost benefits in construction information management through innovation and efficiency (Vaughan, Leming, Liu, & Jaselskis, 2013). Conducting a qualitative case study was the best approach for this research study.

Research Design

A qualitative case study provided the best approach to discover information residential builders need regarding the cost benefits of building green homes (Starke, 2013). In a 2010 study designed to identify financial benchmarks and develop a cost benefit analysis related to business information modeling, Becerik-Gerber and Rice (2010) advanced the notion that case studies that include in depth interviews provide the best research option (Becerik-Gerber & Rice, 2010). The purpose of a case study design is to collect data and information from a natural environment without external constraints (Kemparaj & Chavan, 2013). Information obtained through the literature review framed the design foundation for the interview questions (Shaw, Scully, & Hart, 2014). The case study design included an interpretive approach to analyze data based on participants'

responses and aligned the method with the research to discover the information residential builders need regarding the cost benefits of building green homes (Logie-MacIver et al., 2012). Case study as an interpretive research design involved identifying and understanding emergent themes related to the overarching research question through the participants' stated reality (Lukka, 2014).

Academic rigor is a significant factor in establishing research credibility (Gibbert & Ruigrok, 2010). Quantitative methodologies use standardized processes and statistical outcomes to increase rigor and research credibility (Gibbert & Ruigrok, 2010). The basis for questioning rigor in qualitative studies includes the absence of standardized process and statistical outcomes (C. Cronin, 2014). The implied standardization indicates the reasoning protocols the researcher uses during the data analysis to ensure reliability and validity (C. Cronin, 2014). Deductive, inductive, and abductive reasoning comprise three categories used in logical inference techniques (Park & Park, 2013).

Deductive arguments begin with a general rule to reach a specific conclusion (Park & Park, 2013). Inductive reasoning begins with specific and limited observations to reach a likely conclusion (Kuosa, 2011). Abductive reasoning (common in medical diagnosis) begins with incomplete information and observation to reach an explanation of the observed phenomenon (Kuosa, 2011). Abductive reasoning using the causal elements during data collection and analyzing dominate themes based on regularity in participant responses provides an equal level of rigor and credibility in case study design relating to to quantitative methods (Lukka, 2014). The case study results yielded the in depth information necessary to develop the professional knowledge related to the research

question and provide opportunities to analyze actions for practicality and realistic application within a particular business environment (J. Kim, Price, & Lau, 2014).

Possible research designs for this study included ethnography and phenomenology. The ethnographic design requires the researcher to conduct field investigations through immersion in the study's cultural environment to understand the significance embedded in certain activities and were not relevant to answering the research question (Azevedo & Ferreira, 2013). The phenomenological design focuses on the participant experience as an end goal in relative to a particular event (Wertz et al., 2011). The case study design characteristics provide the researcher a multidimensional lens to explore the phenomena in the study (Easton, 2010). The qualitative case study research design supports the research exploratory goals, data collection instruments, and data analysis (Yin, 2012). The case study research design facilitates the inquiry necessary to test assertions within the problem statement, sets forth a collection paradigm to synthesize multiple perspectives, and analyzes the business processes essential to establishing a cost benefit analysis for building green homes (Aguinis, Pierce, Bosco, & Muslin, 2009).

Population and Sampling

The primary step to gain access to the participant pool included Nevada Home Builders and The NAHB websites website containing information regarding their member organizations. The information listed on the website is public information. The complete online members' directory is available as public information. The link has the names and contact method for each builder. In an effort to gain support for this study, the

SNAHB and BANN executive directors and NAHB assistant vice president for sustainability and green building received a brief summary regarding the general study goals.

The organizational executives granted preliminary permission to conduct the study with their members and agreed to send a letter on their letterhead or make personal calls to their membership regarding participant criteria, and how the residential construction industry might benefit from the study findings (see Appendix B). The executives sent a list of likely organizations based on the participant criteria and follow up emails to their membership encouraging participation in this research study. To protect participant's anonymity, the parent organizations used general membership destination that includes all local executives without identifying participants.

Regarding case study design, purposive sampling provided the best approach when the research aim requires studying specific skills, gain knowledge of a particular phenomenon, and assess various process procedures (Tongco, 2008). The research aim for this study was knowledge acquisition related to the cost benefits of building green in the residential construction sector (Banawi & Bilec, 2014). A purposive sampling strategy supported the participant selection paradigm (Chenail, 2010). Significant factors in narrowing the general pool to the purposive sampling included determining the correct number and experience benchmark criteria to answer the research question (Acosta, 2012). The Builders Association of Northern Nevada (BANN) membership includes construction companies, general contractors, commercial and residential builders, and sales and marketing (BANN, 2015). The SNHBA membership included builders,

professionals from allied trade groups, individuals working in government affairs, and members from nonprofit organizations (SNHBA, 2014). The NAHB' membership includes residential builders, home remodelers, home marketing and finance groups, and building materials manufacturers (NAHB, 2015). The BANN and the SNHBA are local chapters with membership in the National Association of Home Builders. The NAHB membership provided access to local and national building executives that met the study criteria and the selection pool for research participants (Chenail, 2011). Additional references to NAHB include BANN and SNHBA organizations.

Another consideration factor in the selection process included aligning the participants professional background and experience profile with the research design and purpose (Chenail, 2011). Participants meeting the criteria for involvement in this research study must have a minimum of 5 years' experience building residential homes and demonstrated proficiency using sustainable designs as part of their business process for residential homes. Participants' job responsibilities include quality control, they must have primary knowledge of their organizations' business practice, policies, and procedures, and have decision responsibility for residential building projects (Shofoluwe et al., 2012).

The participant pool for this study included residential builders using sustainable design in residential construction companies the Southwest, Northwest, Midwest, and Northeast geographic areas within the United States. Using purposive sampling for this research study allowed in-depth qualitative examination of participants in the residential construction sector (Poulis, Poulis, & Plakoyiannaki, 2013). Randomization decreases

research biases and facilitates generalization to the entire sampling population, random sampling techniques do not allow the researcher to gain in depth knowledge or uncover qualitative aspects in the participants' experience and perception (C. Green et al., 2014). Unlike quantitative methods designed to *count* responses, qualitative research explores the participant's perception of an experience regarding a particular issue (O'Reilly & Parker, 2013).

Methodologists agree that an adequate sample size is necessary to achieve data saturation in qualitative studies; consensus does not connote numeric specificity (Francis et al., 2010). When the participant pool consists of experts in a particular industry, a small sample size less, less than 20, facilitates the researchers efforts to gain an in depth understanding of the issue at the center of the study and appropriate for qualitative research (Crouch & McKenzie, 2006). Guest, Bunce, and Johnson (2006) suggested using 12 participants with a homogenous participant pool. O'Reilly and Parker (2013) argued against setting a numeric designation for the sample size in qualitative studies because distinct characteristics and nuances guide each design approach. Information depth and breadth, together with available resources, provide the structure to determine the appropriate sample size for a particular research study (O'Reilly & Parker, 2013).

This exploratory study related to the residential building industry and the participant's professional experience and industry knowledge provide an appropriate sample size for this qualitative case study research (Hershkovitz & Forkosh-Baruch, 2013). Data saturation should occur with 10 participants based on the professional expertise, and management responsibilities associated with the individuals in the

participant pool (Hershkovitz & Forkosh-Baruch, 2013). Frances et al. suggested implementing a second step for additional interviews until the responses indicate information completeness if the initial 10 interviews do not yield data saturation. The interview process continues until participant responses cease yielding new concepts, themes, or additional ideas (Francis et al., 2010). The information depth and breadth coupled with document analysis and additional data sources improve opportunities to ensure data saturation (O'Reilly & Parker, 2013).

Document analysis includes archived records, marketing brochures, and data collected from online organizational websites. Section 2 includes an in depth discussion related to data collection instruments. The participant pool includes managers from residential construction companies using green techniques. Additional factors when determining the appropriate sample size for qualitative studies incorporate how the researcher develops a professional relationship with the participants and builds trust to create an amicable environment for data collection (Crouch & McKenzie, 2006). Such an environment for truthfulness necessitates smaller sample sizes usually less than 20 participants (Crouch & McKenzie, 2006). When the research aim is exploration and discovery, emerging themes indicate when saturation occurs (S. E. Baker, Edwards, & Doidge, 2014). Identifying a predetermined number for the participant pool presents a challenge for qualitative researchers (S. E. Baker et al., 2014). In a 2011 study the author limited the participant pool to eight to allow in depth probing during interviews and subsequent member checking (Shook, 2011). Reilly (2013) defined member checking as providing an opportunity for participants to review and verify the researcher's

interpretation of their responses during the interview process (Reilly, 2013). Reilly also used respondent validation as a synonym for member checking. Using *respondent validation* as a reference to the traditional member checking term reduces ambiguity and increases clarity related to the member checking process.

In qualitative research redundancy in responses and information themes indicate data saturation and increase replicability opportunities (Kemparaj & Chavan, 2013). Smaller sample sizes are appropriate for qualitative studies (Trotter II, 2012). Banawi and Bilec (2014) suggested 20 interviews as a sufficient population sample when the participant's experience and subject knowledge provide opportunities for in depth exploration to answer the primary research question. Responses in a 2014 qualitative research article included the suggestion of exogenous factors such as the availability and accessibility of individuals possessing the expertise necessary to answer the research question remain the primary concern; limiting qualitative interviews to 10 participants (S. E. Baker et al., 2014).

The 11 executive participants, for this study have extensive experience within the residential building sector and their operational responsibilities indicate they have the knowledge necessary to share information residential builders need regarding the cost benefits of building green homes(Banawi & Bilec, 2014). Selecting and interviewing 11-experienced residential homebuilders that have knowledge other residential builders need regarding the cost benefits of building green homes from the NAHB achieved the saturation goal for this study. The interview protocols offered opportunities for participants to explain, clarify, and elaborate on the questions. The results obtained

during the in depth interviews with residential building experts provided the platform for the emerging themes and ideas to explore the overarching research question. The interview process continued until new ideas or themes cease to emerge and responses indicate data saturation (Francis et al., 2010).

Ethical Research

In qualitative studies, the researcher is the primary data collection instrument and as such, several factors framed the exploration foundation for this study related to personal opinions regarding residential building, perceived nuances in building green, and attitudes related to environmental sustainability as a business process (Reybold et al., 2013). Researchers have an obligation to follow ethical standards that respect human dignity, comport with academic principles to ensure integrity, and protect the participant's anonymity (Mccormack et al., 2012). In the data collection process several steps guaranteed this study complied with established principles, abide within the legal frame for research with human subjects, and protected participants from physical harm and psychological distress (Marshall et al., 2012). These safeguards guided every phase throughout participatory research process (Jenkins, 2012).

The homebuilders did not undergo procedures that presented the potential for mental or physical harm or psychological threats. Addressing the overarching research question did not require vulnerable individuals such as minors, pregnant women, prisoners, and emotionally or mentally disabled people. The EDs and VP received a generic email (no details) requesting permission to interview BANN, SNHBA, and NAHB members (see Appendix A). The Executive Director replied with an email

granting permission to interview organizational members (see Appendix B). Once the IRB approved the proposal, the next step was sending a letter via email, to the BANN, SNBHA, and NAHB membership inviting them to participate in the study (see Appendix C). A statement in the informed consent form notified participants that the Institutional Review Board of Walden University issued approval number 01-05-15-0193885 providing approval to conduct research (see Appendix D). To protect participant's identity, those who agreed to participate sent a reply email with the statement "I have read the above information, I am at least 18 years old, and believe I understand the study well enough to make a decision about my involvement" in the content portion of the email. Participants sent the reply to EnergyandResearch@gmail.com indicating their willingness to participate as an uncompensated volunteer in this research study. Sending the email provided written documentation of their status as an adult participant 18 and older.

The letter to the EDs and the VP included the consent form, information regarding the participant's role to provide information, based on their experience, regarding the cost benefits associated with building green. The consent form indicated the potential benefits resulting from this study to their industry. Protocols for the interview reiterated they read the consent form and desired to continue as a participant (see Appendix E), their option to leave the study, without recrimination or other adverse action to their personal and professional wellbeing (Damianakis & Woodford, 2012). Spoken and written information given before the interview phase included redundancy in advising the participant regarding the research topic, their role in collecting information regarding cost

benefits related to building green, the potential risks, and potential industry benefits because of this research study. Participation in this study was voluntary; participants had the option to withdraw their consent at any time and all notes, participant references, and recorded information collected would be destroyed if the participant withdrew prior to completing the interview. All volunteers: (a) agreed to continue the individual interview, (b) completed interview process, and (c) participated in the follow up email for respondent verification.

Interview questions did not include content that could compromise participant's personal wellbeing or professional status (see Appendix E) (Jacob & Furgerson, 2012). the interview protocols added redundant statements reminding participants they were not required to answer any questions they perceived as harmful or produce discomfort (Connell, 2013). The data collection process began only after receiving the IRB written approval (Roulston, 2010).

Researchers have an obligation to ensure participant's safety and protect participant's privacy using informed consent protocols as an ongoing process throughout the research time line (Nordentoft & Kappel, 2011). Responsibilities associated with IRB approval process included examining the data collection and analysis methods to ensure compliance with existing laws and moral standards governing research with human subjects (Ells, 2011). Additional safeguards included assigning alphanumeric codes to protect participant's individual identity, raw financial data, and exclude associated characteristics and designation that might reveal their organization's name. The invitation to participate also included assurance that only I, as the researcher, maintain

control and sole access to their name, information, and plan to keep all notes and other data collected on a password protected computer hard drive with print copies of analyzed or raw data in a locked file for 5 years. Protecting the information includes deleting electronic data from the password protected hard drive and using a professional shredding service to destroy the print data 5 years after the study is completed in accordance with Walden University research protocols.

Data Collection

Unlike quantitative research, that uses numbers and statistical analysis, qualitative researchers use words to collect and interpret data (Anyan, 2013). The problem and purpose statements provided the design foundation and nature of the data collection process (Merriam, 2014). The data collection section for this study includes information regarding in depth telephone interviews as a data collection instrument and collection technique. The NVivo 10 CAQDA software provided the technology tools to organize, transcribe an interpretation of the telephone interview, and analyze the transcribed data from the telephone interviews.

Instruments

I was the primary data collection instrument. Additional data collection instruments included qualitative interviews and document analysis (Bowen, 2009). Data collection methods for this research included in depth interviews, respondent validation, direct observation at an active residential building site to observe the building process and a completed residential building product as presented to the potential homeowner (end user), and document analysis as part of the case study design. Subsequent

paragraphs include detailed information regarding each method. The qualitative interview is a collection tool to provide in depth examination of cost benefits based on participant responses (Kemparaj & Chavan, 2013). The comprehensive interview provides researchers an opportunity to ask participants about their perceptions and insights relating to a particular phenomenon and ascertain other factual data (Chenail, 2011). Asking the same question to different participants provided a broad and diverse representation to explore the research question (Yin, 2010).

Document analysis is the process used by researchers to examine, evaluate, and interpret written and electronic material as part of the exploratory process in qualitative research (Bowen, 2009). Document analysis as an existing resource provides empirical data for case studies, assists researchers in framing the context for information gleaned through interviews and facilitates data triangulation (Prøitz, 2015). The document analysis procedure is continuous throughout the data collection process. Document information obtained from company websites and other electronic sources, provided the context for additional questions during the responsive interview process (Owen, 2014).

Integrating document analysis with the in depth telephone interviews, response validation process, and other observation techniques is an important step to ensure accuracy during data interpretation, identifying and discussing themes, and data triangulation (d' Angelo & Brunstein, 2014). The research goal for this study was to discover the information residential builders need regarding the cost benefits of building green homes and a case study using comprehensive interviews offered the best data collection opportunity to answer the research question (Yin, 2012). Coupling qualitative

interviews with document analysis as part of the research process helped to explore the participant experiences associated with business practice and policy (Owen, 2014).

An extensive review of existing literature related to energy efficiency, building green, and strategic sustainability provided the development foundation for the interview questions. The purpose of the interview questions, listed in Appendix F, allowed the participant and the researcher flexibility during the discussion and constant comparison for data collection (Jacob & Furgerson, 2012). Integrating the telephone as a communication channel for the interviews increased response rates through scheduling flexibility (A. Holt, 2010). Audio recording provided an opportunity to ensure accuracy when transcribing interview notes (Bouges, 2013). Interviews using teleconferencing as a communication channel combined telephone and audio recording, and maximized time and efficiency (Finlayson, Preissner, Cho, & Plow, 2011).

The data solicited with the research instrument assisted the discovery process and identified the information residential builders need regarding the cost benefits of building green homes. The semistructured interview facilitated discovery during the exploration process (Owen, 2014). Continuous cross checking for consistency in participant replies, additional questioning for clarification, and the member checking process through follow up interviews created opportunities for more in depth understanding of participant perspectives and methodological triangulation for reliability (Carlson, 2010).

According to Denzin (2012), the triangulation process is not a strategy; the process assists the researcher in gaining a comprehensive understanding of the participant's experience. Within the context of this research the purpose of the

respondent validation process allowed participants to review the transcribed information and ensure accuracy in the researcher's interpretation (Koelsch, 2013). Respondent validation tests the veracity of data interpretation, conclusions inferred from the interpretation, and enhances research credibility (Doyle, 2007).

The participant pool consisted of executives from residential building companies. Their experience and professional acumen in the construction industry and building green in the residential sectors of their industry offered an opportunity to gather deep insight related to best practices the construction industry (Choudhry, Hinze, Adetutu, & Gabriel, 2012). Section 3 includes information regarding participant responses, reoccurring themes and trends identified during the interview process.

Data Collection Technique

Yin (2009) suggested interviews, archived records, physical objects, participant observation, and direct observation as resources, and documents as resources for case study evidence. The data collection procedure included telephone interviews with 11 residential builders who have at least 5 years' experience, from the Southern Nevada Home Builders Association., participant response validation, direct observation at three active residential building site, and document analysis. In 2013, Vaughan, Leming, Liu, and Jaselskis (2013) explored the cost benefits related to construction information and management systems (CIMS) and used direct observation as an augmenting process for interviews and discussion related to operational efficiency. The direct observation, for this study, involved visiting active residential developments to see the energy efficiency protocols included in the building phase and comparing on site brochures, company

websites, and the real time processes with information collected during the telephone interviews and response verification stages for this research (Vaughan et al., 2013).

Traditionally, face-to-face dialog served as the preferred interview technique (A. Holt, 2010). Technological advances in communications offer several data collection options to the researcher (Hanna, 2012). According to Block and Erskine (2012), a telephone interview suits the needs of a study when the research includes the need for anonymity, questions allowing fluid responses, and when using purposive sampling to answer specific questions (Block & Erskine, 2012). Internet questionnaires and telephone interviews as data collection tools increase higher participant response, removes circumstantial influences present in face-to-face interviews, and allows the researcher an additional barrier to unintended bias (A. Holt, 2010).

This qualitative study format used standardized open-ended questions and telephone interviews as the data collection tool for this exploratory research (Trotter, Matt, & Wojnar, 2014). The properties embedded in unintended biases compromise the balance of power (transactional power dynamics) between the researcher and participant necessary for knowledge construction, truthful analysis and answering the overarching research question (Karnieli-Miller, Strier, & Pessach, 2009). Transactional power dynamics poses unique challenges for researchers during the participant interviews rendering the terms *structured, and semistructured* insufficient definitions for qualitative research (Anyan, 2013). Anyan (2013) suggested *standardized open-ended identical questions* as an appropriate characterization for the qualitative research interview(Anyan, 2013). Telephone interviews with participants using the 7-question instrument served as

the primary data collection method. The research instrument listed in Appendix F incorporated an expert validation process to ensure alignment between the interview questions and the research goal (Secomb & Smith, 2011).

In this study the *within* methods triangulation approach was used to confirm and validate findings. The *within* methods triangulation facilitates the use of multiple data collection methods within the same research design as a validation technique (Casey & Murphy, 2009). The respondent validation process allows participants an opportunity to clarify statements and provide information to the researcher to increase the depth of understanding (Reilly, 2013). The goals embedded in the respondent validation process provided a method to clarify information obtained during the telephone interviews (Barusch, Gringeri, & George, 2011).

Barusch, Gringeri, and George (2012) also identified two approaches for respondent validation including group discussions and individual participants reviewing the transcribed version for the telephone interviews for accuracy (Barusch et al., 2011). Literary criticism of respondent validation included the possibility that participants may agree with the transcribed information as a way to please the researcher (Reilly, 2013). The respondent validation protocol for this study included participants reviewing the transcribed version of their interview prior to data analysis to corroborate the veracity of the researcher's interpretation. The respondent validation and comparison matrix included any changes, additions, and clarifying remarks obtained during the respondent validation process (see Table 1) to preserve the original response and themes.

Table 1

Respondent Validation and Data Comparison Matrix Example

Question number	Interview response	Respondent validation response	Comments or changes
1. Residential builder's perceptions and awareness of building green homes.			
2. Residential builders view of cost benefit			
3. What facts need to convince residential builders to build green homes			
4. How can energy policies provide incentives to build green homes?			
5. What information do residential builders need to build green homes?			
6. Describe financial variance between initial building costs for green versus conventional construction			
7. Additional information			

The interview questions served as significant factors in the data collection mixture. The purpose of the research questions emphasized issues aligned with (a) the knowledge and strategies of building green used by residential builders; (b) perceptions of successful residential builders related to building green; (c) insights into their business model, marketing strategies, and their financial commitment related to building green. Using a pilot study as an evaluative tool to eliminate ambiguity became an essential step for this process. A pilot study is not a tool to test hypotheses, determine sample size, or provide generalizations for the larger study (Leon, Davis, & Kraemer, 2011).

The purpose of the pilot study was to evaluate the data collection instrument for clarity and revise the research design elements as necessary (Morin, 2013). The number of participants in the pilot study differed from the number identified in the larger study (Leon et al., 2011). Pilot study results assisted the researcher to evaluate the collection process, ensuring adequate resources for participant recruiting, retention, and managing data (Thabane et al., 2010).

The purpose of the overarching research question for this study was exploratory and designed to provide information residential builders need regarding the cost benefits associated with building green. The three expert participants for the pilot study in this research included a marketing professional familiar with green building, a member of the builders' board of directors, and an executive with experience working as the chief financial officer for a residential building company. To ensure continuity in experience and construction setting, builders' membership roster included the participant pool for the three experts. During the expert validation interviews, the participants noted energy

efficiency and green building are usually interchangeable concepts. I changed the wording in the initial interview questions and framed follow up questions to reflect the experts' suggestion.

The protocols for confidentiality, protecting the raw data, and opportunities to withdraw at any time without recrimination were the same as those promised to the participants in the main study. Recruiting for the expert validation process involved requesting participants, as an addendum to an organizational newsletter, with marketing experience, finance skills, and a member of the builders' board of directors prior to beginning the main study participant selection. The feedback garnered from these individuals' knowledge and experiences with sustainable building designs provided the validity necessary to ensure information from the interview questions applied to the overarching research question. The process of including experts with multiple perspectives and various viewpoints associated with their experience within the residential construction sector aligned the protocols and procedures with the research aim for this study and increased opportunities for data triangulation (Ottenbacher & Harrington, 2013).

The data collection mechanics included sending a formal letter to the EDs and NAHB Assistant Vice President for Sustainable Building requesting access to their membership and recruiting participants for the study. The communication email address for this research was EnergyandResearch@gmail.com. The letter also included information regarding the study protocols and potential benefits for the residential construction industry from the stud resulting from this research (see Appendix A).

Once potential participants sent their preliminary agreement to EnergyandResearch@gmail.com, they received an individually assigned alphanumeric code used throughout the data collection, data analysis, and report on findings. The alphanumeric code included the letter P and chronological numbers (P1, P2, P3 . . .) based on the order each participant responded to the initial invitation. The first builder responding received P1 as their alphanumeric code for this study. The last person to respond received P11 as their alphanumeric code for this study. The semistructured questionnaire in Appendix F provided the data collection instrument for this qualitative case study.

The numeric codes removed the need to enter their name on the matrix for interview time selection. Second, an invitation to participate in the study that included anonymity assurance and the opportunity to withdraw from the study at any time without reprisal (see Appendix C) and an informed consent form (see Appendix D). The final attachment to the recruiting email included an interview time matrix with available times for the telephone interview; the conference call number and access code (see Appendix H).

The EnergyandResearch@gmail.com email address served as a repository for the invitation to participate, the informed consent form, and the matrix for interview time selection. Nevada the NAHB served as the organization for collecting information regarding the cost benefits of green (SNHBA, 2014). The data collection technique for this study incorporated teleconference interview notes, audio recordings, marketing

brochures, corporate and organizational websites, and field notes from the residential development site visit.

Telephone interviews: (a) increases geographic accessibility, (b) provides a less formal environment, and (c) encourages veracity in participant responses (Koskan et al., 2014). Technological advances in the 21st century make virtual communication commonplace in peoples' lives (Trier-Bieniek, 2012). The research strategy for this study included purposive sampling as part of the data collection technique. The participant pool included local and national executives with experience and knowledge related to the cost benefits associated with green building. Maximizing data collection during their available time is an important aspect for consideration. Telephone interviews provided the appropriate data collection instrument for this research (Block & Erskine, 2012).

Data Organization Techniques

The purpose of this qualitative exploratory case study was to discover information that residential builders need regarding the cost benefits of building green homes. The study goals necessitated an interview protocol with open-ended questions (Yin, 2009). The semistructured interview provided the exploration platform and facilitated data collection concerning information residential builders need regarding the benefits of building green homes in a cost effective manner (Jacob & Furgerson, 2012). NVivo 10 provides qualitative researchers a computer assisted platform to organize and analyze data (Bazeley & Jackson, 2013).

Qualitative research facilitates comprehensive understanding of issues using a nonnumeric data format (Leech & Onwuegbuzie, 2011). The data derived from the interviews must be transcribed coded, and organized, in a way, that helps researchers identify reoccurring themes (Bazeley & Jackson, 2013). Computer assisted qualitative data analysis software (CAQDAS) incorporated computer technology with an innovative software platform to help researchers organize and analyze data (Rockar & Kohun, 2011). Upon completing the interviews, entering the raw data from the conversations helped organize the data in a manner that was both accessible and secure. The NVivo 10 software program provided several options related to compatibility with various information source including audio, video, websites, and rich text (Leech & Onwuegbuzie, 2011).

During the data analysis phase for this research, I was the only person involved with reading, categorizing, and interpreting data collected during the telephone interviews. The NVivo 10 software included a feature to develop research logs for data entries, offered a category system, and data coding (Bazeley & Jackson, 2013). The goals of the software also assisted the researcher in reporting frequent themes from the interview in an objective manner (Castleberry, 2014). Finally, the NVivo 10 software added credibility and methodological rigor commonly missing in qualitative case studies (Poulis et al., 2013). Redundant security and backup storage procedures preserve the data including storage on a password-protected computer, external hard drive, and using cloud technology (Wen-hui et al., 2013).

Data Analysis Technique

The qualitative method supported the research aim to discover information related to green construction. Case study research methods included direct observation (Gordon, 2011), semistructured telephone interviews (A. Holt, 2010), and reviewing printed and electronic documents for triangulation purposes (Denzin, 2012). The original definition for triangulation included multiple qualitative *within* methods not mixed methods as an analysis technique (Denzin, 2012). Direct observation, semistructured telephone interviews, and reviewing archived documents provided the within methods triangulation for this qualitative case.

Rubin and Rubin (2012) differentiated semistructured from unstructured interviews through definition. Semistructured interviews include one specific subject and prepared questions with opportunities for follow up questions; whereas the unstructured interview includes a general outline and the conversation flow generates subject specificity (Rubin & Rubin, 2012). Exploring a specific aspect of residential building framed this research study; semistructured interviews served as the primary data collection tool for this study.

The secondary method consisted of fieldwork and a field journal related to direct observation at two active residential building sites to watch the building process and walk through a completed residential building product as presented to the potential homeowner (end user). Field notes written during observation help researchers capture thoughts, impressions, and areas of possible personal bias (Sangasubana, 2011). This direct field observation was another way to triangulate data collected from the telephone interviews

and data analysis (Gordon, 2011). Additional benefits included providing a context to clarify information during the response validation period and delineate emerging themes from researcher's perceptions during the coding process for emerging themes (Sangasubana, 2011).

The third method included reviewing company documents in print and those available online. Bowen (2009) suggested several document types acceptable for systematic analysis including advertisements; meeting agendas, minutes of meetings; background papers; books and brochures, event programs, and newspapers (Bowen, 2009). Interpreting and understanding information from the interviews, respondent validation, field notes from direct observation at an active building site, and document analysis framed the within methodological triangulation process as defined by Casey and Murphy (2009). Data receptacles included audio tapes from the telephone interviews, notes from respondent validation, field notes from the site visits, and numeric codes to protect the participants' identity. The compatibility component embedded in the NVivo 10 software allowed the researcher flexibility when integrating audio, visual, documents with PDF extension, rich text, and web information (Edhlund & Mcdougall, 2013) and query the data to extract and analyze single and complex thematic categories and codes in a time efficient manner (Bazeley & Jackson, 2013).

The qualitative data analysis process for this study included audio, text, and numeric coding to protect participants' identity. Discovering the information residential builders need regarding the cost benefits of building green homes requires in depth interviews to gain comprehensive understanding concerning perceptions and attitudes

regarding the cost benefits associated with green construction (Beverland & Lindgreen, 2010). The multifaceted characterizations obtained during the interview process necessitated meticulous interpretation for each thematic tier uncovered during data analysis and establishing validity for the research (Guion, Diehl, & McDonald, 2011). Data organization was the next step in the analysis process. The NVivo 10 software properties provided an analysis platform to assist the researcher in organizing the information according to recurring themes and developing coding protocols (Edhlund & Mcdougall, 2013). The NVivo 10 software content provided the data management tool in classifying the information using words, text, paragraphs, and other internal data related to the research question (Edhlund & Mcdougall, 2013).

Qualitative research yields a sizeable amount of raw text and the data must be interpreted, organized, and analyzed in a manner conducive for replicability (Thompson, 2002). Using innovative technology as part of qualitative research facilitated flexibility, thematic continuity, and increased rigor during the data analysis processes (Lewins & Silver, 2009). According to Cope (2014), current CAQDAS provides a number of program features that improve intuitive operations. The intuitive operations embedded in CAQDAS programs helped the researcher manage data, document the analysis process, and code responses to understand the message conveyed by participant's words relative to the phenomenon studied (Cambra-Fierro & Wilson, 2011). Coded responses are nodes indicating the attributes assigned to participant responses to interview question, location, or other information associated with emerging themes (Gibbs, 2013).

The data analysis process included data reduction, data display, and conclusions and verification (Rettie, Robinson, Radke, & Ye, 2008). Coding and analysis are iterative characteristics in qualitative research; coding was not a substitute for the analytical process (Rettie et al., 2008). Qualitative research yields a sizeable amount of raw text and the data must be interpreted, organized and analyzed in a many conducive for replicability (Thompson, 2002). Using innovative technology as part of qualitative research facilitated flexibility, thematic continuity, and increased rigor during the data analysis processes (Rademaker, Grace, & Curda, 2012).

This qualitative case study included seven questions in a semistructured interview, response validation, and document analysis as data collection instruments. The NVivo 10 CAQDAS software provided the researcher capability to manage transcribed data from: (a) the semistructured interviews, (b) information collected from site visit field notes and, (c) documents used in the document analysis process in a time efficient way (Bazeley & Jackson, 2013). For example, participants framed their responses to the interview questions, differently, regarding cost benefits associated with building energy efficient homes. Using NVivo 10 software assisted with identification of recurring themes associated with the individual answers, field notes from direct observation, import textual sources from electronic documents organizing the themes for coding, and classifying all the data according to thematic nodes (Sung, Hepworth, & Ragsdell, 2013). Each node provided codes based on the file's attributes (Leech & Onwuegbuzie, 2011). In business, the CAQDAS software helps researchers synthesize

and analyze information using qualitative data to obtain relevant answers for global market research (Cambra-Fierro & Wilson, 2011).

Data intersections allow thematic classification for repeating words and phrases comparing and contrasting across various nodes to answer the research question (Hu, Torr, & Whiteman, 2014). The NVivo 10 software captured the words and phrases associated with participant responses, created categories for response consistency, and generated a report based on frequency percentages. The steps to achieve reliable results included transcribing the telephone interview, placing the information into the NVivo 10 software, and following the data analysis procedures listed in the instruction tutorial (Bazeley & Jackson, 2013). Subsequent graphs and charts associated with the analysis are included in the final report.

Reliability and Validity

Reliability

Reliability is an important factor in research efforts and undergirds the credibility relating to outcomes and conclusions (Fan, 2013). Establishing reliability in qualitative studies requires thorough and explicit notations regarding steps and protocols for a particular study (Su, Gammelgaard, & Yang, 2011). In their 2013 study, Ottenbacher and Harrington used expert validation through a pilot study to create construct validity. Expert validation conducted with a different participant pool involved of local executives for residential building companies ensured clarity, removed ambiguous wording or phrases from the data collection instrument, and made corrections to the instrument as necessary before data collection began (Morin, 2013). Explaining each step in detail

increased the likelihood for other researchers attain the same conclusion given the same data and study setting (Merey, 2012). The information obtained by following the steps identified in Appendix E facilitates the research veracity and reliability for this study.

Sending participants a copy of the transcribed interpretation notes from the audio recording, provided them an opportunity to review detailed interview responses, and verify the interpretive accuracy and increased reliability (Carlson, 2010). Verifying participant's answers, response uniformity, and within method triangulation (Casey & Murphy, 2009) provided the construct to test instrument reliability related to the interview questions. Similar responses among the participants throughout the interview corroborated the research instrument and the respondents' accurateness (Stevenson & Mahmut, 2013). Harvey (2015) suggested a continuous member-checking loop as part of the reliability process. The participant and researcher as language learners had an opportunity to simultaneously generate the narrative emerging from interview questions and responses; and created a dialogic approach to the member checking process at every macro stage of the interview (Harvey, 2015). The reliability mechanism included the dialogic approach, response validation (member checking), and document analysis.

Validity

Validity in qualitative research indicates consistency and trustworthiness regarding activities and events associated with the phenomenon as signified by the study results explored in the research (Golafshani, 2003). Validity and reliability increase transparency and decrease opportunities to insert researcher bias in qualitative research (Singh, 2014). The researcher must ensure reliability and validity of the study based on

the ability to maintain neutrality, and trustworthiness (Golafshani, 2003). Establishing validity presents difficult challenges for qualitative researchers (Cho & Trent, 2006). Experts agree on the centrality of research validity, credibility, and reliability in qualitative studies (Konradsen, Kirkevold, & Olson, 2013) and disagree on how researchers adhere to quality criteria within their research projects (Ali & Yusof, 2012).

This research involved qualitative case study design and interview approach, response validation, and document analysis to decrease researcher bias, develop external, internal, and construct validity (Ali & Yusof, 2012; Cho & Trent, 2006; Golafshani, 2003; Tracy, 2010). The purpose of multiple data sources supported research efforts to collect overlapping data as an additional measure to strengthen internal validity (Yin, 2013). Testing the instrument validity became a critical factor in ensuring the objective reporting the subjective data collected during the interview process (Y. M. Kim, 2009). Singh (2014) categorized qualitative studies using construct, internal, and external as validity characteristics.

Construct validity refers to creating operational terms and measurements qualitative researchers use (Singh, 2014). Internal validity refers to the proposed correlations among the operational terms and how the researcher uses those terms concepts in the study (Singh, 2014). Finally, external validity associated with quantitative research aims to generalize study conclusions, and qualitative research aims to understand experience and perceptions regarding a particular phenomenon (Yin, 2009). Validity for the study encompassed interviewing building executives in the residential

construction industry (participant pool) and response validation in the data collection process (Masocha, 2011).

Using different data collection methods for triangulation purposes increased the rigor and validity in this study (Tracy, 2010). Establishing validity in this research project included dialogic approach to member checking (Harvey, 2015), response validity (Reilly, 2013), document analysis (Owen, 2014), and observation at the residential construction process on site (Leicht, Hunter, Saluja, & Messner, 2010). Providing participants an opportunity to review transcripts after audio recordings increased the study's external validity by ensuring the interpretation was accurate and complete. Establishing validity for the instrument included thoroughly documenting each step and all protocols as separate data information in addition to written protocols for data collection, data organization, and data analysis.

Transition and Summary

The purpose of the information in Section 2 expanded the study details through purpose restatement, provided details regarding the researchers' role, and presented the criteria and description for participant selection. Additional information in Section 2 included the research method and design for this study, identified requirements to develop an appropriate population sample size, and stipulated the parameters for ethical research during the data collection process. The goals of Section 2 also provided an explanation regarding the Institutional Review Board's responsibility to ensure participants safety and privacy. Information in Section 2 contained protocol constructs for data collection instruments, data organization, and technology assistance through

CAQDAS to analyze the central research question: What information do residential builders need to know about the benefits of building green homes while remaining profitable?

Searching for words and phrases using the NVivo 10 platform allowed opportunities to study the raw data and subsets simultaneously to identify thematic perceptions (Bazeley & Jackson, 2013). Cross referencing participant response to test emerging themes provided a method to achieve credibility and increased opportunities for transferability for researchers seeking to replicate this research (J. N. Hall & Ryan, 2011). Finally, the goals in Section 2 addressed the reliability and validity as essential elements for transparency and study replication. The information in Section 3 detail the study's findings, significance of the study for residential builders, and the implications for social change through sustainable development.

Section 3: Application to Professional Practice and Implications for Social Change

Introduction

Discovering the information residential builders need was the purpose of this qualitative exploratory case study. The participant pool included 11 residential builders from SNHBA, the BANN, and the NAHB; all 11 builders participated in semistructured telephone interviews and shared their experiences building energy efficient homes. I used respondent validation, participant observation, direct observation, and a review of archive records to demonstrate methodological triangulation. The participating builders incorporate green building practices as part of their environmental policies, CSR portfolios, and as a competitive advantage strategy. During the data analysis, five preliminary themes emerged: (a) environmental concerns, (b) using green building practices to achieve a competitive advantage, (c) corporate social responsibility, (d) need for informed constituencies, and (e) developing coordinated public policies to educate lenders and consumers on the value added qualities related to green building practices and energy efficiency. Developing coordinated policies and consumer education related to energy efficiency in residential construction emerged as the most important aspects to increase builder's participation in green building practices.

Presentation of the Findings

The overarching research question that guided this study was the following: What information do residential builders need regarding the cost benefits of building green homes? The information outlined in this section provides a detailed description of the study findings and outcomes. The section includes a presentation of findings, an

application to business practice, an implication for social change, recommendations for action, recommendations for further study, and reflections. In this section, I also describe the process used to incorporate the NVivo 10 qualitative software to provide the research analysis regarding information residential builders need to know regarding the cost benefits of building energy efficient homes.

Thematic Structure and Conceptual Frame

The overarching research question that guided this study was as follows: What information do residential builders need regarding the cost benefits of building green homes? The single case study applied an exploratory research method to the data collected during the telephone interviews with 11 residential builders (purposive sample), respondent validation, participant observation, direct observation, and reviewing marketing brochures and websites to demonstrate methodological triangulation. The participants identified the absence of supportive policies in the builders' quest to expand green building practices within the residential construction industry (Littlefield, 2013). Although defined as a scientific phenomenon, Roger's diffusion of innovation theory encompasses social network processes (Rogers, 2010).

Establishing horizontal and vertical communication networks are significant factors relative to advancing the DOI process within the residential construction industry (Matisoff & Edwards, 2014). Communication networks for diffusion models include word of mouth along with other media marketing resources (Huh & Lee, 2014). The communication networks help legislators develop policy relative to current economic

conditions and assists builders in calculating the levelized cost of the energy used in residential construction (Huh & Lee, 2014).

Rogers's (2010) diffusion of innovation theory includes principles incorporated in improvement theories, adopters theory, and the innovation-decision processes and was appropriate for this study as a conceptual frame (Woodward et al., 2014). The emerging themes shown in Figure 1 included (a) the environment, (b) competitive advantage, (c) consumer education, (d) CSR, and (e) supporting policies framed the structure for this study. Figure 1 represents the composite description relating to the homebuilders' responses grouped into themes that emerged from the data analysis.

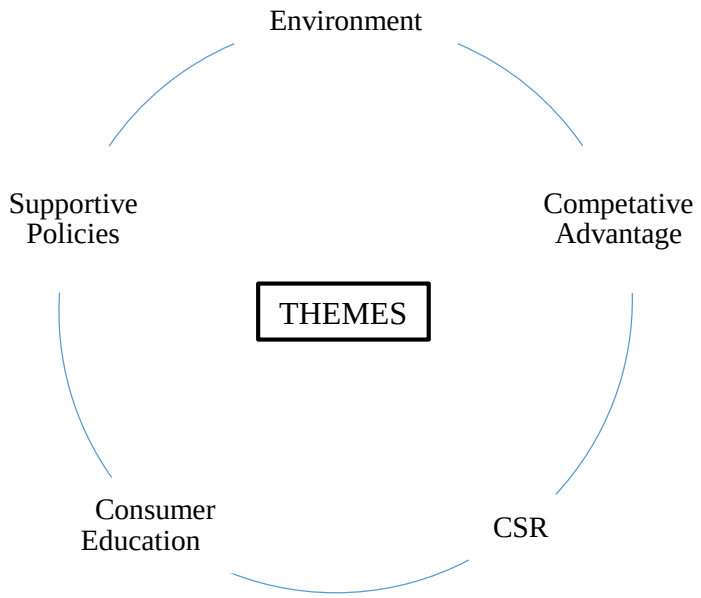

Figure 1. Description of emerging themes.

The DOI theory provided the conceptual framework for this exploratory study. The DOI theory as an applied concept includes an interpersonal communication process

between producers and consumers by which products, services, and ideas progress from inception to adoption (Im & Ha, 2012). The interlocking themes shown in Figure 2 include the communication aspect inherent in the DOI framework. The environmental concerns, competitive advantage strategies, and marketing include the need for the early adopters (builders) to develop a method to transmit knowledge to a broader consumer demographic. Knowledge paucity and policy discrepancies hinder the EE adoption rate among average consumers (Schubert & Stadelmann, 2015).

The additional cost for homebuyers and the financial risk incurred by builders present exigent circumstances in the DOI process for the EE residential market. The consumer base for Participant 6 included first time homebuyers and low-income demographic groups, also known as BoP consumers. The participant acknowledged the financial risk associated with an uncertain ROI (builder and consumer) inherent in using green practice to build energy efficient homes when the client demographic included BoP consumers. Diaz-Rainey and Ashton's (2014) study results concluded successful policies designed to induce diffusion should target homeowners from high socioeconomic consumers first; higher socioeconomic groups exhibit characteristics consistent with early adopters' behaviors.

In response to the interview question regarding necessary knowledge to use green practices to build energy efficient homes, Participant 6 said, "If my customers demanded energy efficient homes, I would build them." Though the task is daunting, the adoption rate for BoP consumers is possible through a time commitment to build trust, learn the

community's culture, and use trust to frame co creation value (Ratcliff & Doshi, 2013). Theme 5 supports the BoP value cocreation literature relating to consumer education.

Eliminating the trepidation and misconceptions regarding extraordinary costs requires a concerted effort to develop the horizontal and vertical networks to disseminate the cost benefits associated with green building principles. Figure 2 represents the interlocking themes representing homebuilders' opinions regarding necessary information to transition to green building practices.

Figure 2. Interlocking themes.

The NVivo 10 software program provided the platform to examine and group the emerging themes from the interviews, document analysis, and field notes. Information gleaned from the telephone interviews may provide the residential construction industry leaders with marketing strategies to increase their competitive advantage. The

information related to consumer education may assist policy makers in developing coordinated legislative initiatives to increase energy efficiency programs as part of U.S. state and federal energy agendas.

Theme 1—Environmental Considerations

All the participants agreed green building standards are a necessary step in achieving the environmental goals. Participant P2 stated, "Incorporating green practices saves money for the builder and the consumer." The participants also indicated most builders pass the cost savings on to the consumers as part of their business model. Builders participating in this study indicated national residential construction companies integrate environmental concerns into their CSR portfolios. The results of a 2015 study indicated corporations' altruistic aspirations need independent monitoring to validate a company's environmentally friendly assertions (Amato et al., 2015). The environmental claims study results also confirmed a correlation between a company's financial health and independent verification related to their environmental policies and the CSR portfolio (Amato et al., 2015).

Theme 2—Competitive Advantage

All participants except P6 acknowledged more builders use optional green building methods as part of their standard residential construction offering within the industry. The responses from P10 and P11 indicated green building practices yield an immediate benefit in time and the cost savings associated with using sustainable materials. The cost savings provide an opportunity to decrease operational costs and pass some of the savings on to the consumer. The cost savings strategy is one method to

expand horizontal differentiation while improving their company's competitive advantage. Companies look at cost savings in every aspect of their business process, especially during an economic downturn when the must do more with less resources (Delmas & Pekovic, 2015).

Theme 3—Corporate Social Responsibility

Participants P1 through P5 said that the cost variance for green building adds an additional 10 to 15% to the building cost, and those using green standards do so as part of their CSR values and marketing differentiation approach. Although many companies embrace CSR as a core value, some business leaders interpret protecting the environment while increasing profits as incompatible concepts (Leandro & Neffa, 2012). Using the juxtaposition between environmental consciousness and economic efficiency as a policy paradigm eliminates opportunities for shared value creation through community and stakeholder synergy (Porter & Kramer, 2011). The participating builders specified environmental consciousness as a significant factor in their business' triple bottom line. Introducing the shared value creation as described by Porter and Kramer (2011) captures one concern related to the builders' initial investment and consumers' knowledge delta regarding the value added in green homes. The commitment to sustainable development provides the builders an opportunity to respond to environmental concerns in their respective communities, increase profits, and expand their competitive advantage (Escobar & Vredenburg, 2011).

Theme 4—The Importance of Informed Consumers, Realtors, and Lenders

The trend in residential construction is toward green building practices. The study participants also suggested the quandary for some builders relates to the lack of knowledge among mortgage lenders, real estate professionals, homebuyers, and home appraisers regarding the value added in green construction. The residential builders interviewed identified education as a primary element in expanding green building and energy efficient homes. The builders suggested developing value added and pricing education opportunities for consumers, realtors, and mortgage lenders as a way to create parity within the industry. For their part, consumers may not understand the long-term savings available when purchasing a new energy efficient home. Austere economic conditions exacerbate the effects of uninformed consumers paucity understanding (Green & Peloza, 2015). The participants posited the notion that when consumers see two houses side by side with the same style, square footage, location, and one built using green design standards the homebuyers chooses the house with a lower price point. The results from a 2015 study suggested communication networks are important factors in DOI processes designed to increase the consumers' understanding of energy efficiency as a cost savings measure in new construction and the benefit in retrofitting older homes (Diaz-Rainey & Ashton, 2015). The builders' responses are consistent with research outlining the adopters' trajectory and the need for policies to induce consumer adoption (Diaz-Rainey & Ashton, 2015).

Theme 5—Developing Supportive Public Policy

During the data analysis, the need to develop supportive public policy emerged. Indeed, 50% of the participants suggested anemic or nonexistent policies related to energy efficiency in the residential construction industry compromised growth in green building practices. The concerns raised by the participants are similar to issues in a study related to the role of coordinated policy measures in advancing environmental innovations (Quitzow, Walz, Köhler, & Rennings, 2014). The study findings completed in 2014 indicated a need for comprehensive policy development and supply side intervention as critical components in assisting market dynamics to facilitate expansion new innovation markets (Quitzow et al., 2014). Using innovation as a product provides policy flexibility for legislatures and creates opportunities for interdependent relationships with private capitalization (Lim, 2014).

Summary of the Findings

From the data collected during the telephone interviews, marketing brochures, websites, and site visits to active building locations, the findings supported five themes from the literature review related to using sustainable development as a competitive advantage tool for residential builders. The literature themes include (a) environmental protection (d' Angelo & Brunstein, 2014), (b) energy efficiency as a competitive advantage strategy (Kalenoja et al., 2011), and (c) green construction as brand differentiation (Elliott, 2013). Although five categorical themes emerged, the participant responses indicated three interlocking themes as a synthesis factor in the decision to use sustainable development. The interlocking themes included (a) educating consumer

regarding value added in energy efficiency measures (Trianni et al., 2014), (b) using innovation to facilitate positive social impact (Greve, 2011), and (c) the need for supportive public policies (Houston, Gyamfi, & Whale, 2014).

The within methods triangulation process includes multiple qualitative approaches to answer a research question (Howe, 2012). Direct observation, semistructured telephone interviews, and reviewing archived documents provided the qualitative approaches for the within methods triangulation for this qualitative case study. The study results paralleled the literature review themes and provided an opportunity to increase study validity using the within method triangulation. The five categorical themes that emerged through the data analysis included (a) environmental concerns, (b) competitive advantage strategy, (c) informed constituencies, (d) corporate social responsibility, and (e) public policies that support sustainable development within the residential construction industry. The constructs woven into the five themes included (a) building an effective communication network (resource opportunities for builders and ancillary industries), (b) evolving social and sustainability cultures, (c) using technology, and (d) the importance of innovative leadership.

The participants using green building practices identified brand differentiation as a significant factor in developing a marketing strategy to increase their competitive advantage. The participants also emphasized the need to coordinate public policy between federal and state authorities to maximize available incentives and synchronize reporting periods for tax rebates to encourage builder's to use green building practices.

The participants identified inconsistencies, coordination deficiencies in state and federal policies, and fluctuating building codes as disincentives for builders.

Although the study findings paralleled six themes in the literature review, additional analysis using the *within* method triangulation indicated environment, competitive advantage, and supporting policy as the recurring themes regarding the information relative to cost benefits of using green building practices in residential construction. Participant responses regarding the environment supported statements regarding their organization's CSR activity. The emerging theme from consolidating environment and CSR themes indicated environmental concerns were significant factors in developing the builders' CSR policies. Responses from 73% of the participants used some variation of "It's the right thing to do for our environment," as the descriptive basis for their CSR portfolio.

The discussions regarding competitive advantage indicted participants used green building practices as a differentiating factor in their marketing efforts. The builders offered differentiation as a critical component in their competitive advantage strategy within the residential construction industry. The study findings indicate 91% of the participants used differentiation as a marketing tool to increase their competitive advantage among the emerging green consumer group.

Developing supportive public policies (state and federal) emerged as the third prominent theme in the study findings. Although some U.S. state and federal policies promote energy efficiency, the current business model does not provide viable incentives for power producing companies to participate energy efficiency standards (Satchwell et

al., 2011). Table 2 represents the thematic overlap between the literature review and the study findings.

Table 2

Overlapping Themes

Literature review	Identified in the study	Literature review and study findings
Environment Concerns / Protection	Environmental concerns	Yes
Competitive advantage Energy efficiency as a competitive advantage strategy	Using green building practices to achieve a competitive advantage;	Yes
Consumer education Value added in energy efficiency measures	Need for informed constituencies;	Yes
CSR Using innovation to facilitate positive social impact	Corporate social responsibility;	Yes
Differentiation Green construction for brand differentiation (Elliott, 2013)	Sets green builders apart from builders using traditional practices	Yes
Public policy Need to develop comprehensive energy policy	Public policies to educate lenders and consumers regarding value added using energy efficiency.	Yes

The knowledge paucity among mortgage lenders, home appraisers, and realtors emerged as a source of consternation for the participants using green building practices to build energy efficient homes. Reviewing NAHB education courses, professional designation programs, and courses offered by the Appraisal Institute (AI) related to additional monetary value and best practices to market energy efficient homes indicated education resources exist (AI, 2015; NAHB, 2015). Some real estate professionals, appraisers, and mortgage lenders lack awareness and knowledge of the NAHB and AI training resources.

Summary of Builders' Response to Interview Question 1

The summary analysis represents the participant's opinions regarding green building practices and building energy efficient homes. With the exception of participant P 6, all participant responses had a positive opinion of using green practices to build energy efficient homes. The participating builders also suggested developing policies to educate consumers on the value added qualities related to green building practices and energy efficiency (Houston et al., 2014). The participants except P6 identified environmental concerns as the primary factor in pursuing energy efficiency standards for residential construction. Participants P1-P5 and P7-P11 stated addressing the environmental concerns framed their CSR portfolios. The marketing brochures and websites highlighted building practices that reduced the carbon footprint and other conservation efforts. P4 stated, "All builders should strive to incorporate green building practices into their residential projects as a way to show their commitment to sustainable development."

Another theme expressed throughout participant responses related to perceptions regarding green building practice included product differentiation as a competitive advantage strategy. Only P6 responded with a negative perception regarding the necessity of green building practices related to residential building. The anomaly in the perception held by P6 is consistent with the Laursen and Salter (2014) study results referencing an organizations' ability to appropriate knowledge gained externally and apply the results to a strategic plan for growth.

Although P6 knew other builders used green building practices in residential construction, P6 did not believe the process was relevant to their business model or their target population. Rather, P6 stated, "First time homebuyer requests shaped our business model and building green would price those buyers out of the market." P6 also believed adding green building principles required several thousand dollars in addition to the base price per home. P6 did not indicate a willingness to explore possible cost benefits related to the value added described by the other 10 participants. The assertion made by P6 did not evolve from empirical knowledge gleaned from market research, only the perception that building energy efficient homes would not improve their profit margin or increase their competitive advantage. The position held by P6 supports the results opined by Nieves and Salter (2014) related to the absence of declarative knowledge and a leader's inability to detect business opportunities through innovation.

Summary of Builders' Response to Interview Question 2

This summary analysis represents the participant's opinions regarding the cost benefits of building energy efficient homes. Although, 91% of the participants use green

building practices and support expanding opportunities to build energy efficient homes, they also stated customers reap most of the benefits regarding savings on utility bills and personal health. The participant responses indicated builders make a significant financial investment to build energy efficient homes; however, their investments yield negative and asymmetric returns. The study participants continue to use green building practices because of their commitment to protecting the environment and advancing sustainable development. The builders also fretted about the lack of coordinated public policy to allow mortgage processes to include builders' initial investment as a consideration when determining the dollar amount for the consumer's loan. The study participants also suggested developing incentive polices for consumers considering new home purchase. The suggested policy would provide incentives commensurate to the value added based on green building standards. The program would also encourage lenders to decrease the individual's mortgage percent rate when purchasing an energy efficient home. The third suggestion included policy uniformity in appraising energy efficient homes.

The participant's responses also noted building energy efficient homes provides an opportunity for brand differentiation to support their competitive advantage strategies. Consumer education related to cost benefits available in homes built using green practices depresses demand for energy efficient homes. P5 stated, "Homebuyers receive immediate benefits in the form of cost savings on energy based on energy star appliances, insulation, and low E coating on windows." These additions reduce energy loss and provide a cost benefit to the consumer not the builder. P5 works for a national residential construction company; that company's CSR goals and values reflect their decision to use

green building practices as a commitment to the environment while working to educate more consumers regarding the environmental and economic benefits associated with energy efficient homes.

P6 suggested some homebuyers might have other than altruistic motivations and purchase energy efficient homes to *boost* their ego and not as part of a commitment to energy conservation. Findings in one article in the literature review suggested a conditional correlation between education, perceived social status and consumers who purchase green (Elliott, 2013). Conversely, findings in a different study revealed an increase, globally, in environmental assessments related to politics and interdependent citizenship as the progenitor for a shift toward a green consumer culture (Luck & Ginanti, 2013).

Participants P10 and P11 explained the cost benefits regarding monetary savings, lower operational costs, and increasing construction efficiency. Using green materials such as structurally insulated panels (SIP) cost less than tradition sheet rock. An added benefit is the time saved by reducing the three-step process to one-step because the insulation is already in the panel. The study findings indicated 63% of the builders acknowledged consumers reaped the benefits related to builders using green building practices. P11 referenced sub contractors' time saved working on a green project; and the sub-contractors savings provided a cost benefit to the builder. With exception of participant P6, the responses echoed the CSR theme and placed a higher intrinsic value on protecting the environment through energy efficiency.

Summary of Builders' Response to Interview Question 3

This summary analysis represents the participant's opinions related to factors considered during the decision process to move from traditional building practices to employing green building practices in residential building. Prominent themes in the responses to interview question three included environmental concerns, competitive advantage through product differentiation, and a commitment to the CSR goals established by their companies and within the industry. Participants P2, P3, P5, and P7 identified environmental concerns as factors in their decision process. Participant P5 referred to the opportunity to decrease energy use, good corporate citizen (CSR), and the triple bottom line as major considerations in transitioning to green building practices.

A substantial 64% of the participants cited product differentiation as a means to achieve a competitive advantage as a major factor in their decision to use green building practices. In a 2012 study, the results established a significant correlation between using sustainable development as a tool to increase profits and an organizations' competitive advantage (Bouglet et al., 2012). Reviewing the marketing brochures, web sites, and literature available for consumers looking to purchase homes in new developments supported their assertions related to energy efficiency as a marketing tool for horizontal product to increase their competitive advantage. P10 stated the following:

> It is important to use financial data as a way to convince builders to begin transitioning to green building practices. Once the new builder identifies the true cost savings related to green building and the opportunity to increase their market share in the emerging eco consumer demographic, the choice becomes academic.

Summary of Builders' Response to Interview Question 4

This summary analysis represents the participant's opinions related to energy policies within their respective states related to incentives or other measures to facilitate green building practices and energy efficiency in the residential construction industry. The participant responses paralleled information discovered during the literature review and suggested the need for more coordinated policies to facilitate more sustainable development in the residential construction industry. Participants P1-P6, P8, P9, and P11 believed the electric power producing companies should do more to promote energy efficiency. The builders referenced some energy policies connected to their state gas and electric energy companies.

The data analysis indicated 72% of the participants could not give detailed information describing existing state policies. The 72% participant responses indicated a lack of awareness about state or federal policies designed to promote and incentivize green building practices. The responses suggested minimal knowledge of financing mechanisms available to consumers desiring to purchase green built energy efficient homes. The participant's prevailing opinions suggested the energy companies and the limited rebate programs did not provide adequate incentives to promote energy efficiency through green building. The participants' responses indicated a need for government entities to use innovation as a marketing purveyor to increase adoption rates (Lim, 2014).

Summary of Builders' Response to Interview Question 5

This summary analysis represents the participant's opinions regarding information builders need to know to transition to green building practices and build energy efficient

homes. Although participants overwhelmingly supported environmental considerations as reasons to use green building practices in residential construction only 18% cited the environment as part of the information necessary to convince other builders to incorporate green building practices as part of their business model. Environmental benefits emerged as a consistent thread between each participants' response regarding durability, cost benefits of using recycled materials, and building healthier homes. All the participants recommended builders understand energy efficiency as a tool for product differentiation to increase a company's competitive advantage. The opportunity to increase a company's competitive advantage is a significant factor in the decision process to use green building practices. The response from P6 included the need for market analysis that showed homebuyers wanted energy efficient homes and using green building principles would increase the company's market share as the only reason to build energy efficient homes.

Additional remarks indicated 81% of the participants thought consistent and supportive policies would facilitate growth in the green building model and persuade more builders to seriously consider the energy efficient business model. All participants, except P6 indicated , energy policies should include a strategy to educate consumers, mortgage lenders, and appraisers on the net present value (NPV) related to energy efficient homes and provide results from independent studies related to an direct explanation regarding the builders construction cost, time savings, and cost savings for consumers. The participants also suggested other builders become familiar with available resources through local homebuilders' chapters.

Study participants also suggested professional homebuilders reserve time to access information available to industry members through the NAHB continuing education workshops and the annual international homebuilders show (IBS). The IBS offers educational events, product innovation displays, and high performance building zones with interactive construction displays (NAHB, 2015). All participants, except P6, were familiar with the IBS and stressed the importance of attending the event to their subordinates.

Summary of Builders' Response to Interview Question 6

This summary analysis represents the participant's opinions regarding the financial variance between the initial building costs for green construction versus conventional construction. Participants estimated financial variance between green and conventional construction cost from 2%-30% and dollar amounts from no additional costs to $15,000 more to build an energy efficient home. Participants stated,

> The qualifying variables included: (a) the energy efficiency for the home; (b) whether the builder uses green practices as their standard offering; (c) the price point for homes in different developments; and (d) local building code requirements and national standards.

P1 stated,

> I do not really see a financial variable. Although the homebuilder invests more in the initial cost, consumers benefit through energy savings. Consumers purchasing one of our homes are more likely to tell other family members and friends about their satisfaction level and the cost benefits of purchasing from our company. The

> investment, for us, pays off with new customers and second time homebuyers. In addition, whatever the initial cost to build green homes we recoup with the knowledge that our company is doing our part to protect the environment.

Participant P2 estimated no cost increase or as much as 30% based on the Energy Star appliances, energy saving products such as low flow toilets, tankless water heaters, and air conditioning units. P2 introduces energy saving items at different price points for their products. The incremental change in the price point allows buyers an opportunity to choose the green percent for their homes according to their financial ability. Although building green may increase builders' costs, 45% of the respondents suggested the environmental benefits, product differentiation opportunities, and the competitive advantage within the residential construction industry mitigates any additional costs associated with using green building practices. As residential construction criterion increase, many green building practices become standard versus optional as a method for builders to maintain their established customer demographic.

Participants P11 believed the increased building costs saved time and money with respect to efficiency and labor costs. P11 used pre cast foundations (PCF) and structurally insulated panels (SIP) as examples of cost savings related to green building practices. A homebuyer asked the residential construction company, owned by P11, to use environmentally friendly materials and green principles in the floor plan selected by the buyer. The homebuyer did not specify PCF or SIP, as must have items. Participant P11 used PCF and SIP as part of the green building practice and saved the customer $80,000 below the cost to build a conventional home. The savings represented lower

costs for concrete, sheet rock, and insulation if purchased separately. Builders using PCF and SIP do not have to pour walls or spray insulation. The foundation items include the necessary materials. Thereby, decreasing some of the steps used in conventional construction and labor costs.

Developing supportive policies to increase EE growth in residential construction emerged as the most important observation by all the participants. Participants P2, P5, P6, P8, and P9 based their financial variance estimates on the incongruent definitions between state and federal building codes. Participants P1-P4, P7, and P10-P11 suggested the need for policies to help consumers understand the increased valuation and lower utility costs as benefits in EE homes. All participants, except P6, indicated policy makers should develop appraisal and evaluation standards for tangential industries (realtors, mortgage lenders, and appraisers) when considering the real customer valuation associated with purchasing an EE home.

Summary of Builders' Response to Interview Question 7

This summary analysis represents the participant's response to "What additional information, not already asked, would you like to provide?" The participants' statements provided extemporaneous remarks addressing issues not previously or areas they wished to provide amplification. Participants P1, P3, and P5 emphasized environmental concerns as the primary reason to use green building practices. Preserving natural resources and protecting the planet emerged as the basis for their environmental concerns and the decision process to include environmental consciousness as part of their corporate values and responsibilities portfolios. Participant P2 suggested finding a balance between

mandated policies and energy targets as a method to increase energy efficiency in residential construction. P3 and P4 stated,

> Builders want to do what is best for the environment and the consumer. However, the price point for EE homes is usually beyond the consumer's financial reality. Growth in the residential construction industry requires a lower price point for first time homebuyers.

The need to educate consumers on the cost benefits related to EE homes emerged as a reoccurring theme throughout the interviews. P7 identified consumer education as the missing factor for understanding value added using green building practices to build EE homes. Participant P7 stated, "When consumers understand the health and economic benefits available in purchasing energy efficient homes, they will choose energy efficient over conventional construction." Participants suggested elements in the consumer education plan should include three elements. First, consumers need to understand the differences in building code standards between energy efficient and conventional homes. Second, consumers should understand the performance path for homes with respect to R rating insulation, ceiling height, and energy efficient windows. The third element in the education process should include providing information and consistently reminding the consumer about the health and economic benefits available in energy efficient homes.

Although 91% of the participants alluded to affordable financing to purchase energy efficient homes, participant P8 suggested implementing a study to evaluate opportunities for property assessed clean energy (PACE) community based funding. The PACE program allows residents to obtain loans to improve the energy efficiency in their

homes, repay the loans over 20 years and treat the loan as a tax deductible expense (Jacobson et al., 2014). Participant P8 suggested using the PACE program as a model to help homebuyers looking to purchase new energy efficient residential construction.

Data Coding and Transcription

The residential builders provided invaluable insight into the decision processes related to their commitment to building energy efficient homes, using differentiation as a marketing strategy to promote their products to consumers, and incorporating green building as a tenant in their CSR portfolios. Using the letter P coupled with chronological numbering (P1, P2, P3 ….) helped ensure confidentiality during the study and in preparing the findings. After completing the transcription process, the next step included sending the telephone interview interpretations to participants for review and approval via email to ensure accuracy. The instructions in the email indicated individual participants needed to review the statements and respond with changes, additions, or a statement indicating they agreed with the transcription.

After receiving confirmation regarding the accuracy in the transcriptions, the next step included uploaded the raw data into the NVivo qualitative data analysis software as a method to identify recurring themes and ideas. The results yielded an in depth narrative to answer the overarching research question regarding information residential builders need to know regarding the cost benefits of building energy efficient homes. The information in Appendix I encapsulates the Interview Interpretation responses for the Raw Data Collected during the telephone interviews. With the exception of a few editorial insertions for clarity and syntax, the interpreted responses provide the

participants' actual words to ensure the accurate portrayal of their ideas. This summation is the platform for the thematic, textural, and structural descriptions of the participant's responses. Each Table represents the summarized transcribed interpretation for participant responses using the major themes as identified with the NVivo 10 software.

Applications to Professional Practice

The study results provided answers for the overarching question in this study regarding information residential builders need related to the cost benefits of building green homes. Participant responses revealed three essentials knowledge components used in their decision process to use green building practices and build energy efficient homes. First, builders need to know how green building principles provide operational benefits through time efficiency and the cost savings using environmentally friendly materials. The second element in the decision process relates to how green building practices provide product differentiation to support the company's competitive advantage strategy. The third information component included the builders' commitment to protect the environment and conserve natural resources.

The study results provide information options executives in the homebuilders' associations might use in establishing electronic data resources to show other residential builders the environmental, economic, and social benefits related to building green homes as the residential construction industry continues to grow. The participants also identified the need to improve consumer education related to the value added component as a decision factor when purchasing a new home. The study findings might assist environmental groups, community resource centers, agencies that train first time

homebuyers, and ancillary professions in forming collaborative information brochures and website links that provide information to consumers detailing the cost benefits of purchasing an energy efficient home. Business and industry leaders might use the information to help small and medium residential construction companies understand the ROI associated with using green building practices to expand energy efficiency. Learning how to use green building practices for product differentiation and increase the horizontal competitive advantage might help homebuilders using conventional construction methods transition to green building practices. The transition contributes to environmental sustainability and economic optimality for residential construction companies.

State Policies and Utility Profits

In 2003, Nevada Governor Guinn, through the Nevada legislative body established the Renewable Energy and Energy Conservation (REEC) Task Force. The REEC Task Force report identified energy efficiency as a mutually beneficial program for consumers, businesses, utilities, and the environment (Geller, Mitchell, & Schlegel, 2005). A 2006 report released by the Kansas Energy Council recommended developing energy efficiency programs as a method to reduce demand and as a resource in the state's comprehensive energy planning agenda (Snead, 2006). In 2008, The National Action Plan for Energy Efficiency consortium estimated effectively administered energy efficiency programs might save $500 billion in savings by the year 2025 (Kaufman & Palmer, 2012).

Conversely, ambitious energy efficiency policies often produce negative consequences on electric utility companies economic viability (Brennan, 2013). One study suggested the disparity between the fiduciary duties and social concerns and environmental considerations are independent and beyond reconciliation (Sandberg, 2013). When considering strategies to achieve a triple bottom line, companies blend environmental, social, and corporate governance (ESG) factors into their strategic planning efforts (Fuhr, 2013). Integrating ESG factors with the decision process yields more options in the form of socially responsible investing (SRI) and provides a hybrid approach to include CSR goals with the company's investment strategies (Sandberg, 2013).

The benefit corporation model mitigates the anxiety associated with SRI activities (McDonnell, 2014). The benefit corporation emerged in 2010 as a legal entity for businesses and investors seeking to couple their commitment to social and environmental concerns with the fiduciary responsibility to maximize profit opportunities (McDonnell, 2014). Although more than 90% of the builders participating in this study indicated they used ESG and SRI elements in their decision to build green, participants' response to interview question 4 did not indicate universal knowledge among builders related to state polices or how local energy companies used elements within government policies in a collaborative manner within the residential construction industry.

Practical and Policy Challenges Embedded in Energy Efficiency Programs

Balancing energy efficiency programs without compromising the ROI for stockholder's investment in public utility companies presents a formidable challenge for

policy makers (Satchwell et al., 2011). In 2012, electric utilities budgeted almost $6 billion for energy efficiency programs (York, Kushler, Hayes, Sienkowski, & Bell, 2014). Although the increased dollar investments reflect progressive goals in energy efficiency programs, the investments contribute to significant financial losses for the utilities (York et al., 2014). Other study results related to the effects of ambitious energy efficiency policies indicate negative consequences on electric utility's economic viability (Brennan, 2013).

Although the programs benefit consumers and contribute to CSR goals, the incongruence between the fiduciary duties, social concerns, and environmental considerations are independent and beyond reconciliation (Sandberg, 2013). When considering strategies to achieve a triple bottom line, companies blend environmental, social, and corporate governance (ESG) factors into their strategic planning efforts (Fuhr, 2013). Integrating ESG factors with the decision process yields more options in the form of socially responsible investing (SRI) and provides a hybrid approach to include CSR goals with the company's investment strategies (Sandberg, 2013).

Successfully integrating energy efficiency programs with financial goals requires an archetype that includes community based economics and environmental viability (Byrne & Taminiau, 2015). Utility companies such as Xcel Energy in Minnesota use financial incentives for strong energy efficiency performance to balance stakeholder interest in the environment and the obligation to maximize stockholders investments (York et al., 2014). Although many states developed policies for energy efficient resource standards (EERS), the policies do not include financial incentives for the utility

companies to meet energy efficiency goals (Downs & Cui, 2014). The investment and collective ROI for stockholders and stakeholders increases when state energy efficiency policies include financial incentives and cost recovery mechanism for the utility companies that meet established targets (Downs & Cui, 2014).

Implications for Social Change

The implication for positive social change includes providing information resources to small, medium and emerging (SME) residential construction companies regarding the cost and environmental benefits associated with using green building practices (Bouglet et al., 2012). The World Resources Institute (2014) also reported state programs that improve the efficiency of homes and businesses regularly save consumers $2 for every dollar invested, in some cases as much as $5 (Bianco et al., 2014). When electricity demand goes down, utilities avoid investments in new power plans and other infrastructure, saving money for all electricity consumers in the region.

The study results also indicated a need to revisit energy policies at the state and federal levels to ensure the energy efficient programs include the opinions of stakeholders and stockholders. Although, economic circumstances contribute to the slow policy diffusion rate for energy efficiency programs; conflicting state policies, institutional political entrenchment, and social barriers negatively influence the adoption rate as well (Parker-Flynn, 2015). Overcoming barriers requires measured, methodical, and practical U.S. government policies supporting conservation and energy efficiency, and that gives it a chance equal in the marketplace to that enjoyed by conventional sources of energy. A

comprehensive energy strategy promotes economic development and technological gains in all business sectors within the energy industry (Matisoff & Edwards, 2014).

The study results also contribute to social change by providing a policy template to develop comprehensive energy strategies that include renewable energy, energy efficiency, and finance instruments to leverage public and private dollars to increase growth within the residential construction industry. The study results might serve to frame discussions between homebuilders and homebuyers; persuade the two entities to develop communication and education networks as mutually supporting goals. Building green homes using sustainable development precepts helps increase economic growth opportunities associated with the construction industry, conserve natural resources, and reduce greenhouse gas (GHG) emissions (Rehm & Ade, 2013).

Recommendations for Action

The purpose of this qualitative exploratory case study was to discover the information residential builders needed regarding the cost benefits of building green homes. The study results established a growing segment of builders using sustainable building processes. A line-by-line analysis of participants' responses, in conjunction with NVivo 10 software, lead to the disclosure of 5 categorical themes and 3 interlocking themes (environment, competitive advantage, and marketing) emerging from multiple data sources. The 5 categorical themes emerged that answer the overarching research question regarding information builders need related to the cost benefits of using green building practices. The 5 categorical themes considered when making the decision to build green homes: (a) environmental concerns, (b) competitive advantage strategy, (c)

informed constituencies, (d) corporate social responsibility, and (e) public policies that support sustainable development within the residential construction industry.

The results of the study also indicated a lack of awareness of existing policies to compensate builders' initial investment in green built residential construction. The participants also agreed consumers need education programs to understand the value added when purchasing energy efficient homes and the cost benefit related to energy savings. The findings should encourage leaders in the residential building industry to develop education and marketing strategies through collaborative community partners and utility companies. U.S. state and local governments provide more energy policy initiatives than the federal government (Menaker et al., 2012). Developing coordinated policies related to energy efficiency in residential construction emerged as the most important aspect to increase builder's participation in green building practices. The following recommendations for action apply to state governments as options to enhance existing energy policies.

Participants agreed horizontal and vertical communication networks are an invaluable asset to the sustainable development DOI process. Developing the communication networks should include information diffusion. Possible dissemination methods include: (a) via literature, (b) discussed in a continuing education session during the NAHB convention, (c) as an agenda item during the National Conference of Environmental Legislators (NCEL), (d) during the International Business Council for Sustainable Energy annual meeting, and (e) as an agenda item during the United Nations Framework Convention on Climate Change policy discussions.

Recommendation 1

The study findings indicated a need for a comprehensive energy strategy at the state and federal level. The first recommendation requires the legislative or executive branch of state government to create a statewide working group to review existing energy policies to ensure policies comport with legislative intent for energy strategies and recommend modifications for existing policies. Stakeholders commissioned to develop a communications strategy may include homebuilders, utility customers, utility companies, financing institutions, realtors, property appraisers, and environmental advocates. The policy review process offers an opportunity to ensure the policies do not contribute to onerous regulations for the utility companies, stifle growth in the renewable and energy efficiency industries, or increase energy costs to consumers. An additional task for the working group might include reviewing how the state uses new technologies associated with energy strategy and business development.

Even though energy efficiency programs exist, the builders' responses suggest legislative entities should coordinate, develop, and implement an energy strategy that includes more stakeholders in planning conversations. The statewide working group provides a dynamic entity focused on energy strategy and assists legislators and regulatory agencies to identify an energy efficiency program that supports the state's EERS goals. The second benefit derived from the working group relates to reviewing existing and new building codes to ensure state policies support progressive energy efficiency programs and builders' efforts to expand green building practices in residential construction.

Recommendation 2

The study participants identified truncated communication networks as an impediment to increasing consumers' adoption of green homes. In 2013, the United Kingdom implement the *Green Deal* a program to help homeowners retrofit their homes to improve energy efficiency (Gillingham & Palmer, 2014). In 2013, the United Kingdom introduced *The Green Deal* as an energy financing program for 390,000 homeowners to retro fit their homes (Pettifor et al., 2015). Only 7,200 homeowners decided to participate in the program (Pettifor et al., 2015). Insufficient information regarding energy efficiency cost benefits for homeowners slows the adoption rate for innovative technology (Wilson, Crane, & Chryssochoidis, 2015). Consumers need information regarding costs savings over the life cycle of energy efficient products and understand higher prices as a NPV investment decision (Gillingham & Palmer, 2014).

Consumer behavioral analysis related to lower than expected outcomes suggest energy efficiency programs should include policy drivers and a communication strategy to personalize the benefits for homeowners as part of the adoption process (Wilson et al., 2015). Recommendations from the state's energy working group may improve horizontal and vertical communication networks related to increasing energy efficiency programs through a focused marketing campaign to educate consumers about the cost benefits associated with green homes and energy efficiency.

Using social media as a communication resource mitigates the cost associated with a focused campaign. Social media is a prominent communication tool and helps businesses develop focused customer engagement as a marketing strategy (Oviedo-

García, Muñoz-Expósito, Castellanos-Verdugo, & Sancho-Mejías, 2014). A 2013, survey indicated 75% of U.S. business executives and 63% of international corporate managers view social media as an integral part of their strategic plan (Kane, Palmer, Phillips, Kiron, & Buckley, 2014). Findings from the MIT Sloan Management Review and Deloitte research group indicated consumers expected and preferred communicating with utility companies through social media (Kane et al., 2014).

The working group might assist in developing public service announcements (PSA) for social media outlets Twitter, Facebook, and Instagram and conventional venues such as television and radio. Using conventional media outlets and social media as B-C communication methods with the PSA vignettes could improve consumer's understanding of green building practices and energy efficiency as significant components in the state's robust energy strategy. The education campaign might also assist in framing the need for shared value creation between utility customers and utility companies.

Recommendation 3

U.S. state legislators should commission a panel to research the viability of green banking as one method to improve options for energy efficiency financing. The participating builders indicated the funding paucity presents a significant challenge for builders, homebuyers, and homeowners looking to retrofit their residence to conform to energy efficiency standards. A comprehensive energy strategy should include financial instruments to assist consumers in the purchase and installation costs for energy

efficiency materials (retro fit), Energy Star appliances, and renewable energy transmission equipment (new home construction).

Clean energy technology (CET) offers economic sustainability and commercial appeal. The lack of available low interest capital hinders growth (Peters, 2014). Supporting growth in the CET industry requires eliminating the disparity between traditional funding sources and innovative capitalization such as *state green banks* (Kennan, 2014). Green banks mitigate income challenges and limited access to credit for low income consumers and demographic populations on fixed incomes (Gillingham & Palmer, 2014). Green banks use low cost loans and extended repayment periods to create affordable financing options for consumers desiring to purchasing energy efficient products and other EE technology (Diaz-Rainey & Ashton, 2015).

Reducing the carbon dioxide (CO2) footprint, providing affordable sustainable access to the world's population, and judicious use of existing energy resources require $2 trillion dollars in investment capital (Kaminker & Stewart, 2012). Establishing a state working group to investigate how green banks participate in emerging energy strategies. A state legislative energy committee may use the following parameters as a template to study the viability, development, and implementation processes to establish a state green bank:

1. Explore the methods of capitalization, structure, organization, and financing of green banks in and outside the United States.
2. Review the sources, types, and amounts of private capital available as leverage or investment opportunities in connection with green banks.

3. Identify the current and potential size of existing and potential markets for clean energy in Nevada.
4. The need to provide reasonably priced financing or establish related market structures to increase clean energy market penetration and fill any existing market gaps;
5. Identify financial instruments or services used by a green bank to finance energy efficiency and CET projects including loans, leases, credit enhancements, warehouses, and securitization.
6. Explore legislation enacted in other states regarding green banks and recommend policy options related to legislation to enhance energy efficiency programs, resource standards, and incentive programs the committee considers during the state green bank study.

State green banks offer a financial instrument to leverage existing public funds and private investor's dollars, bridge the current financing gap related to conventional banking institutions, and provide financial resources for clean energy and energy efficiency projects. CET Energy market stakeholders include utility customers, utility power companies, businesses, and regulators, independent power producers, homeowners, and businesses. Different business, environmental, and cost considerations motivate individual stakeholder groups in diverse ways. Green banks provide a public private partnership, at the state level, to finance clean energy projects (Kennan, 2014).

Recommendations for Further Study

This single case study potentially provides foundation for researchers to explore other aspects related to state energy policies and using the DOI theory to assist state legislators in developing coordinated strategic policies that promote growth within the residential building industry through comprehensive planning. Additional studies might include examining lending policies with financial organizations to identify information mortgage lenders and residential appraisers need to assess the value proposition associated with energy efficient homes. The business entities for this study included SNHBA, BANN, and NAHB organizations. Further study might replicate this research in commercial construction, or as a case study exploring the effect of state policies on sustainable development within the construction industry. Litigating the veracity of anthropogenic climate change and recommending a strategy or course of action for builders were topics outside the scope of this research. Further research related to the cost benefits of reducing the anthropogenic causes of climate change and the health benefits related to energy efficient homes may be beneficial to the health care industry in developing cost actuaries for chronic diseases.

Growth trajectory comparisons developed for state legislatures may include energy efficiency as an element in the comprehensive energy strategies. The trajectory comparisons may identify transferable policies to assist other state legislatures and potentially provide an energy policy template to develop shared value creation between utility customers and utility companies. Further research may include multiple case studies to explore the relationship between various marketing venues and consumer

education related to understanding the financial value proposition in purchasing a home built using green building practices and a home built using conventional building procedures.

Reflections

The DBA Doctoral Study process provided an opportunity to explore the personal intersecting interest's areas: (a) energy policy, (b) communication constructs, and (c) innovative leadership in organizational dynamics within the legislative process. The participants' responses challenged my personal bias toward rapidly expanding renewable energy use among consumers without concern for utility companies as equal stakeholders in developing a viable energy strategy. Prior to conducting this research, the personal bias restricted a complete understanding of unintended consequences related to the renewable portfolio standards as the foundation for energy policy development.

Although I had some knowledge of energy efficiency, the knowledge parameters did not include the need to include EE as a factor in energy policies. Prior to conducting this Doctoral Study, the inclination to include residential builders, realtors, appraisers, and mortgage lenders as stakeholders in developing legislative models for an energy strategy did not exist. The study results broadened my knowledge base regarding: (a) the need to broaden the stakeholder base, (b) include academic studies as a resource factor in legislative policy discussions, and (c) ensure horizontal and vertical communication networks exist as a tool to diffuse information among innovators and potential adopters. Adding the academic component to the legislative process may eliminate conflicting state policies, mitigate institutional political entrenchment, and reduce the social barriers that

limit the EE adoption rate among households with low and moderate-income opportunities. Although residential builders consider the environment in their decision to use green building practices, residential homes built with sustainability the study results include competitive advantage and decreasing operational expenses as motivating factors to use sustainable development.

Summary and Study Conclusions

The study results supported the decision to use the qualitative case study method in this exploratory research. The diffusion of innovation theory provides information on the consistent communication process and guide necessary to move a new idea from the initial implementation phase into consumer adoption (Trianni et al., 2014). The DOI theory provided the best method to understand the participants' lived experiences, the absence of a horizontal and vertical communication network, and the need for policy makers to develop comprehensive energy strategies. The lack of coordinated policies to support continuous innovation in the residential construction industry contributes to intermittent progress among builders using green practices and hinders recruiting conventional builders in adopting sustainable development business models. Although the focus of this study related to information builders' need about the cost benefits of using green building practices, participants' responses indicate the need to provide the same information to legislators, financial enterprises, and consumers related to focus of this study.

Although the demand for green construction continues to grow, the construction industry lacks a universal template related to transitioning from traditional building

models to green construction projects (Mokhlesian & Holmén, 2012). Builders in the residential construction industry also need consistent and coordinated policies related to energy efficiency to increase the number of builders and buyers as innovation adopters (Yi, 2013). Providing information for executive decision makers within the residential building industry regarding the cost benefits of integrating sustainable development and innovation as a business process for growth served as the basis for this research (Bouglet et al., 2012).

Business leaders in the residential building industry could use the case study findings to explore communication strategies to educate builders, financial institutions, consumers, and residential appraisers on the cost benefits and value added properties embedded in energy efficient homes. Participant responses also indicated building energy efficient homes provided opportunities for horizontal (away from competitors) and vertical (higher value classification) through product differentiation. The study results are consistent with Makadok and Ross (2013) regarding product differentiation as: (a) an opportunity to restructure an industry, (b) reduce cost and increase profits, and (c) restrain rivalry. The 2013, study findings suggested using differentiation decision points to achieve the horizontal and vertical classifications to create additional economic value above that offered by competitors within the industry (Makadok & Ross, 2013).

The study findings also comport with the 2015 research related to industrial symbiosis (Paquin et al., 2015). Residential builders and green manufacturing companies provide an exemplar for industrial symbiosis. The process to dispose of construction and demolition (CD) waste creates spatial constraints for landfill companies and increases

construction costs; however, when the recycled CD waste becomes part of the material used in other environmentally friendly (SNHBA, 2014). Using the CD waste and processing the excess into valuable products for residential builders creates value for the recycle and construction industries (Paquin et al., 2015). Residential builders use the recycled products from green manufacturing companies in flooring, insulated panels, landscaping, as part of green building practices to create energy efficient homes (NAHB, 2015).

The narrow geographic parameters in the initial proposal limited the participant pool to local builders. Many of the local builders contacted did not meet the established participant qualifications for this study. Additional research results indicated many companies had an ongoing affiliation with the NAHB. During a telephone conversation to explain the study focus and parameters with the executive director for NAHB and residential builders in Nevada, the members confirmed an extant affiliation with the NAHB.

The local builders' connection to the national companies allowed expansion geographically to include other members of the NAHB. The corporate connection between the local and national offices also maintained the study integrity with respect to the data collection process. The NAHB website included information regarding the local home builder's chapters (NAHB, 2015). The participant pool included 11 homebuilders. Only one participant's responses deviated from the positive perception of building green homes.

Summary

The data collection process began with inviting builders to participate in this study. The executive directors agreed the study results could benefit their industry and mitigate existing policy and consumer education challenges limiting a robust adoption rate among conventional homebuilders. The executive directors' enthusiasm did not create an expeditious response from the membership. Limiting the participant pool to a single geographic area contributed to the 3-month delay in data collection. The delay exacerbated time constraints to analyze data and write the presentation portion of Section 3 for this study. In hindsight, expanding the participant pool to include NAHB would improve timely responses from the organization's membership.

The data analysis process resulted in five categorical themes and three primary themes emerging from multiple data sources. The categorical and primary themes coupled with respondent validation framed the three dimensional foundation for the study findings. The categorical themes provided a framework to answer the overarching question for this research. The primary themes provided a foundation for recommendations for action and further research regarding builders' lived experiences lived experiences regarding the use of sustainable development as a competitive advantage tool.

The participants' insights resonate with current public perception related to utility companies' anemic participation in energy efficiency programs. Only 25 states have energy efficiency resource standards (EERS) as part of their energy policy (Steinberg & Zinaman, 2014). Although builders participating in this study live in only a portion of

the 25 EERS states, each participant suggested the utility companies should do more regarding the promotion of energy efficiency. Public opinion and participant responses notwithstanding, balancing energy efficiency programs without compromising the ROI for stockholder's investment in public utility companies presents a formidable challenge for policy makers (Satchwell et al., 2011). The imbalance challenge frames the fiscal dichotomy for the incumbent utility companies (Satchwell et al., 2011).

Study Conclusion

First, the environmental concerns contribute to the decision process as part of residential builders' commitment to reduce the CO2 emissions, conserve energy, and protect other natural resources. The second reason builders use green building practices relates to increasing their competitive advantage. Using green building practices improves builders' horizontal and vertical product differentiation. Horizontal differentiation moves the product away from competitors' mass appeal and closer to boutique consumers, while vertical differentiation moves the product into a different value classification potentially appealing to all consumers (Makadok & Ross, 2013). The product differentiation facilitates their competitive advantage strategy, saves operational costs, and increases efficiency throughout the building process.

Using green building practices adds another dimension to homebuilders' marketing strategies, reduces project costs, and increases profits. Sustainable development principles provide a comprehensive approach to improve the financial health, business survivability, and the triple bottom line (TBL) for residential builders. Supportive and integrated government policies are necessary to; (a) sustain the builders

initiatives in sustainable development, (b) reduce the trepidation associated with uncertainty related to the company's ROI, (c) develop a robust DOI process to disseminating information to the residential construction industry, consumers, and affiliated organizations, and (d) increase economic growth within the construction industry.

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Appendix A: Letter to Request Member's Participation

Dear

This letter comes as a formal request to interview members of the Southern Nevada Home Builders Association. I am a doctoral student at Walden University completing a Doctorate in Business Administration (DBA). You may recognize my name as part of the state legislative body. This study is completely separate and independent from that role. Participation in this study will not confer legislative favors or punitive action should you choose not to participate.

I am conducting a research study to discover information residential builders need about the cost benefit of building green. In a dynamic market, strategic planning integrates innovation throughout business processes for continuous improvement. Sustainable development and pioneering leadership support strategic planning, increases competitive advantage, and maximizes profit margins. The study's potential benefits include providing relevant information to *all* residential builders regarding the cost benefits of building green and assist in developing long-term plans for sustainability within the construction industry. The individual interviews should take about 30 minutes to complete. The final document excludes personal information, company information, or financial data outside the scope of this research project. The researcher is the only individual to have access to your name, company information, and any information given during the interview. All notes and other data collected are stored on a password-

protected computer hard drive with print copies of analyzed or raw data in a locked file for 5 years, as required by the university.

If you have, additional questions feel free to contact me via cell phone or email. Thank you in advance for your positive consideration.

Respectfully,

Pat Spearman, ABD

Walden University

Appendix B: Permission Letter From SNHBA Executive Director

SOUTHERN NEVADA
HOME BUILDERS
ASSOCIATION

June 30, 2014

To: Pat Spearman
From: Nat Hodgson – Executive Director
Re: Permission to Contact SNHBA Members for Research Project

On behalf of the Southern Nevada Home Builders Association, it is our pleasure to provide assistance to you with your research on sustainable residential construction practices among local home builders.

It is our understanding that you need to contact SNHBA builder members for your qualitative exploratory case study to discover the information residential builders need regarding the cost benefits of building green homes.

Therefore, the association grants you permission to contact its builder members (list provided here) for the purposes of your research, and further, the association wishes you success in this valuable endeavor.

Sincerely,

Nat Hodgson
Executive Director

4175 S. Riley St., Suite 100 Las Vegas, NV 89147 702-794-0117 Fax 702-794-2439 www.snhba.com

Appendix C: Invitation to Participate

Dear (potential participant's name)

I would like to invite you to participate in a research study to discover information residential builders need regarding the cost benefits of building energy efficient homes. I am conducting this study as the final stage of my Doctor of Business Administration dissertation through Walden University. You received this invitation based on your executive position in your company and experience in the residential building industry. Participant requirements include:

- Have a minimum of 5 years' experience building residential homes.
- You must have demonstrated proficiency using sustainable designs as part of your business process for residential homes.
- Job responsibilities include quality control, primary knowledge of your organizations' business practice, policies, and procedures.
- Have decision responsibility for residential building projects.

The final report excludes any personal or company identify information and the data collected during the telephone interviews serves as the exploratory tool used for analysis purposes only.

Please read the *Informed Consent Form* carefully and ask any questions that you may have before acting on the invitation to participate in this study. In lieu of signatures, and to protect your privacy, please send a scanned copy of this document, from your

private email address, to *without* your signature. Dr. Cheryl Lentz of Walden University serves as the committee chair for this research. If you have additional questions, regarding this study or your rights as a participant feel free to send an email to me via or to Dr. Lentz at the research committee chair.

Appendix D: Informed Consent Form

CONSENT FORM

Purpose of this research: The purpose of this qualitative exploratory case study is to discover the information residential builders need regarding the cost benefits of building green homes.

Dear _____

Thank you for volunteering to participate in this research study. The informed consent form is a required document for all research participants and provides information to help you understand the study's purpose and decide whether you would like to participate. Should you decide to participate please send a copy of this document, from your private email address to the enclosed email address. The researcher is Pat Spearman, a doctoral student at Walden University completing a Doctorate in Business Administration (DBA). You may recognize her name as part of the state legislative body. This study is completely separate and independent from that role. Participation in this study will not confer legislative favors or punitive action should you choose not to participate. Walden University's approval number for this study is 01-05-15-0193885 and it expires on January 4, 2016.

Background information

This qualitative case study explores various elements of building green in the residential construction industry. Sample interview questions include:

Please describe some basic business principles used in green construction.

Why is green construction a part of your business model?

Voluntary Nature of the Study

Participation in the study is voluntary and without payment. You may decline to answer any question that makes you feel uncomfortable. Additionally, you may withdraw your consent at any time, during this interview and all notes, references, and recorded information (given by you) enter a destruction process. Your withdrawal does not impose any reprisal or negatively affect your professional standing.

Risks and Benefits of Being in the Study

Participating in this study poses no risk to your safety, physical wellbeing, or psychological health. The study includes protocols to ensure academic integrity, respect for you as a human being, and to protect your anonymity. The study's potential benefits include providing relevant information to *all* residential builders regarding the cost benefits of building green and assist in developing long-term plans for sustainability within the construction industry.

Interview Design and Process

The study format includes a semistructured interview lasting 30 minutes. As a participant, you will have an opportunity to provide your ideas and perspectives regarding cost, strategies, benefits, and risks as they relate to residential construction and building green. The data collection phase included 11 individual interviews with residential building executives from Nevada and other NAHB members. Telephone interviews provide the communication method for all interviews to maximize participant's time.

After completing all interviews, the process to transcribe the audio data begins, and a second interview allows the participant to review and verify information accuracy contained in the transcribed document. You may request a summary copy of the study results after the research findings are submitted for publication. The summary does not include any participant's identifying information. Protecting the information includes deleting electronic data and destroying the print data after 5 years.

Privacy and Information Security

The study purpose is discovering the information residential builders need regarding the cost benefits of building green homes discovering. Therefore, the final document excludes personal information, company information, or financial data outside the scope of this research project. The researcher is the only individual to have access to your name, company information, and any information given during the interview. All notes and other data collected are stored on a password-protected computer hard drive with print copies of analyzed or raw data in a locked file for 5 years, as required by the university.

Statement of Informed Consent

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. Please make a copy of this informed consent form, keep for your records, and return a scanned copy to the email address below. Retuning this document to the researcher, at, (*without signature*) indicates my understanding of the study requirements and specifies my willingness to participate as an uncompensated volunteer in this research study. The next steps include sending an

emailed appointment matrix with days and times for each interview that accommodates your schedule: all times are *first come, first serve* basis.

Contacts and Questions

If you have additional questions now, or later, please contact the researcher via cell phone at or by email at. If you would like to discuss your rights as a participant, please contact the Research Participant Advocate for Walden University in one of the following ways:

Call within the USA: 1-800-925-3368 ext. 1210

Outside the USA 001-612-312-1210

Email address: irb@waldenu.edu).

The Walden University's approval number for this study is 01-05-15-0193885 and it expires on January 4, 2016.

Appendix E: Interview Protocols

Participants will email a copy of the informed consent constituting their informed consent to participate as an unpaid and uncompensated volunteer in this study. The following statements provide the structure and procedure protocols for the interview:

1) Send each participant the interview call and access numbers and electronic calendar with available times and days for the interview.
2) Ask the participant for permission to begin the audio recording for the interview.
3) If participant agrees to the audio recording, move on to protocol 4.
4) **Begin the audio recording**
5) Ask the person if they read the consent form in its entirety and agree to continue as a participant in this study.
6) Welcome each participant with these opening remarks: *"Hello, My name is Pat Spearman and I am a Doctoral student at Walden University. Thank you so much for volunteering to participate in this study."*
7) "*The total time for this interview is 30 minutes*.
8) If the participant decides not to give their permission to do an audio record of the interview: *"Thank you (participant's name), I respect your decision. I need to take written notes of your responses to capture your perceptions about the cost benefits of building green homes. The interview may require an additional time commitment to ensure I write your responses accurately. Are you still willing to participate?*"

9) Assure the participant that all responses will be confidential: *"(Participant's name) all of your responses are confidential and the published doctoral study will not include any recognizing information in order to protect your identity*.

10) Check to make sure they received an email copy of the written informed consent form. Did you receive the document? The consent form includes; a) the Walden Institutional Review Board (IRB) number for this study, b) .an email address for the Chair of my Doctoral Study Committee, and c) an email contact for the IRB if you have additional questions beyond this interview about the nature and purpose of this study."

11) *Are you still willing to participate?*"

12) Explain the study's purpose and interview procedure: *"The purpose of this study is to discover the information residential builders need regarding the cost benefits of building green homes."*

13) *"The interview format is open ended questions. Please feel free to add clarifying remarks you deem appropriate*.

14) Statement of consent and option to withdraw from the interview process: *"(Participant's name) this interview is voluntary and you may decline to answer any question that makes you feel uncomfortable. Additionally, you may withdraw your consent at any time, during this interview (given by you) and all notes, references, and recorded information previously collected enters a destruction process. Your withdrawal does not impose any reprisal or negatively affect your professional standing"*

15) Begin asking the interview questions.
16) After participant answers all questions, “Thank you (participant’s name) again for your willingness to participate in the study
17) Advise participant that you will provide them a copy of the transcribed interpretation of the audio recording. (Participant’s name), I will send you a copy of the transcribed notes from this audio recording. Once you receive the document, please review for accuracy, sign the document, and return it using EnergyandResearch@gmail.com. Thank you again for your time and sharing your wisdom.”

Appendix F: Interview Questions

The following questions provide information as to their personal knowledge about green construction:

Q1: What is your perception and awareness of building green homes?

Q2. What do you view as the cost benefits of building green homes?

Q3. What factors do you use to convince residential builders to build green homes?

Q4. How have state energy policies provided incentives for you to build green homes?

Q5. What information do you need to build green homes?

Q6. Describe the financial variance between the initial building costs for green construction versus conventional construction.

Additional details regarding their perception of the cost benefits of green construction in residential building and provides specific information to answer the research question:

Q7: What additional information, not already asked, would you like to provide?

Appendix G: Email to Review Transcript Accuracy

Dear (Participant's Name),

First, I want to thank you for your willingness to participate in this study to discover the information residential builders need regarding the cost benefits of building green homes. You provided valuable insights and your comments assisted this exploratory study immeasurably. Please review the attached transcript from your telephone interview to ensure accuracy. If you find inaccuracies or want to omit something, in the transcript, you may use the *strikethrough feature* in the Microsoft Word program. If you would like to add something for clarity or additional insight, please turn on the *track changes* (found in the Review tab on the menu bar) transcript please use the track changes feature on Microsoft Word. Please return the entire document via email no later than XXX, XX, 2014. If the transcript is complete and accurate to the best of your knowledge reply to this, email using "*Transcript is complete and accurate and no changes made*" in the email subject line.

Before the analysis process begins, all identifying elements (name, organization, address, email address, etc.) will be removed have been removed to protect your privacy and ensure anonymity. If you have any additional questions, please contact me via cell phone at or via email at. Thank you again for sharing your time and insights as a participant in this study.

Appendix H: Sample Interview Time Schedule

WEEK 1		
PARTICIPANT CODE	DAY	TIME
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		

RESPONSE VALIDATION		
PARTICIPANT CODE	DAY	TIME
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		