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Strategies to Create Value Through Innovative Business Models for Community Energy

Abhijeet Acharya
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Walden University

College of Management and Technology

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Abhijeet Acharya

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the review committee have been made.

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Walden University
2020

Abstract

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by

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MSc, Roehampton University, 2016

BTech, Anna University, 1995

Doctoral Study Submitted in Partial Fulfillment

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Doctor of Business Administration

Walden University

April 2020

Abstract

The low-carbon-energy transition from the sociotechnical perspective involves citizen engagement at a grassroots level to develop renewable energy systems. Leaders of community energy cooperatives (CECs) who do not use business models driven by innovative ecosystems and new ventures miss opportunities to create value. Grounded in the theoretical triangulation of sustainable entrepreneurship and the quadruple helix innovative model, the purpose of this qualitative multiple case study was to explore strategies that community energy business leaders employ to create value through business models driven by innovative ecosystem and new ventures. The participants included leaders from 6 community energy companies in the United Kingdom who successfully created value through business model innovation. Data were collected through semistructured interviews, annual reports, mission statements, and field reports. Thematic analysis identified 5 emergent themes: purpose-driven entity with actions to multiply impact, collaboration and partnerships, opportunity identification and realization, growth focused and commercial venturing, and innovation and shared knowledge. The implications for positive social change include the opportunity for community energy leaders to promote sustainability and reduce carbon emissions by setting up local renewable energy systems driven by innovative business models.

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Dedication

I humbly dedicate this doctoral study to my wife, Ipsita Acharya, and my daughter, Sweta Acharya, for their unconditional support, encouragement, and endurance throughout this doctoral journey.

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I would like to acknowledge and thank my chair, Dr. Lisa Cave, for her guidance and support. This doctoral study would not have been possible without her valuable suggestions and timely feedback throughout the research life cycle. I would also like to thank my committee member, Dr. Carol-Anne Faint, for guiding me to complete the doctoral journey. My special thanks to the University Reviewer, Dr. Deborah Nattress, for her reviews and suggestions that helped me to reach the finish line.

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Section 1: Foundation of the Study

The business leaders of community energy cooperatives who implement small-scale renewable energy projects using a cooperative or collective ownership model provide social, environmental, and economic benefits to their local communities (Vancea, Becker, & Kunze, 2017). Community energy business leaders who implement these models show the traits of social entrepreneurs and use grassroots innovation to achieve their business objectives (Becker, Kunze, & Vancea, 2017). The United Kingdom's Department of Energy and Climate Control (2015) recognized the importance of community energy groups in fostering innovations and bringing social and economic benefits to local communities. However, lack of sector-specific policy support, coupled with the gradual withdrawal of government subsidies in the United Kingdom, has rendered it necessary for business leaders in community energy to explore new strategies to create value through innovative business models (Creamer et al., 2018). The objective of this study was to explore the successful business model innovation strategies that business leaders in community energy in the United Kingdom use in creating value for their organizations.

Background of the Problem

The leaders of developed countries have recognized the importance of citizen-led renewable energy systems (Saintier, 2017). The process of low-carbon-energy transition poses sociotechnical challenges and necessitates citizen engagement for grassroots initiatives (Van Der Schoor, Van Lente, Scholtens, & Peine, 2016). The business leaders of community energy cooperatives (CECs) who have implemented a cooperative model

have developed renewable energy systems and delivered social, environmental, and economic values. There are over 2,800 CECs in Europe, with over 900 located in Germany and 500 located in the Netherlands alone (Koirala, Chaves Avila, Gómez, Hakvoort, & Herder, 2016). Leaders of CECs face challenges such as frequent policy changes, withdrawal of subsidies, and lack of project funding supports. Business leaders in community energy need to recognize the importance of assembling multi-actors and adapting to a changing landscape as a way to deal with continuously evolving low-carbon-energy policies in sociotechnical settings (Markantoni, 2016). According to Hall, Foxon, and Bolton (2016), the U.K. government provides market-based policy support for energy transition where smaller renewable energy generators need to compete with large incumbents in the market. In spite of the withdrawal of feed-in-tariffs support and other capital incentives since 2015, the outlook of the community energy sector in the United Kingdom remains cautiously positive; business leaders are willing to innovate and adopt new strategies (Community Energy England, 2018; Saintier, 2017). The objective of this study was to explore the successful business model innovation strategies that business leaders of community energy in the United Kingdom have used to create value in their business.

Problem Statement

The process of low-carbon-energy transition poses sociotechnical challenges and necessitates citizen engagement for grassroots initiatives (Van Der Schoor et al., 2016). There are over 2,800 citizen-driven CECs in Europe, with over 900 located in Germany and 500 in the Netherlands alone (Koirala et al., 2016). The general business problem

was that some individuals in CECs are risk-averse, avoiding new business ventures for economic growth while lacking entrepreneurship skills to scale up their businesses as they deliver social and environmental values to local communities. The specific business problem was that some leaders in CECs lack strategies to create value through business models driven by innovation ecosystems and new ventures.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies that leaders in CECs employ to create value through business models driven by innovation ecosystems and new ventures. The targeted population encompassed business leaders from six CECs in the United Kingdom who had successfully created value through business models based on collaborative innovation processes and new ventures. The implications for positive social change include the potential opportunity for community energy leaders to develop innovative business models through an entrepreneurship mindset to provide energy security, sustainability, and employment to local communities. The research findings may also provide guidelines for community energy leaders to build and scale up renewable energy systems in countries facing energy deficiencies.

Nature of the Study

I used a qualitative methodology to conduct an in-depth inquiry using open-ended questions to study a phenomenon in a real-life context. In qualitative studies, researchers need to discover emerging ideas and concepts related to their subjects; researchers operate in the qualitative research context to establish trust, increase participation, and

develop an in-depth understanding of phenomena (Saunders, Lewis, & Thornhill, 2015). The qualitative method was appropriate for this study because the purpose of the study was to explore and interpret a phenomenon through an in-depth inquiry. Quantitative research is usually associated with a deductive approach, where the researcher's focus is on using data to test an existing theory (Saunders et al., 2015). Thus, a quantitative method was not suitable for the study. The mixed methods approach includes both qualitative and quantitative elements (Creswell, 2009). Because my goal was to explore strategies, I did not plan to test hypotheses, so there was no need for the quantitative portion of a mixed method. Therefore, a mixed method approach was not applicable.

I analyzed four possible qualitative research designs—(a) ethnography, (b) phenomenology, (c) narrative, and (d) case study—for use in this study to explore strategies for innovative business models. An ethnographic study's success largely depends on the researcher's ability to develop familiarity with participants' culture and environment; additionally, the researcher has to gain access to participants' community for fieldwork by building good one-on-one relationships before starting the research (Abdulrehman, 2017). Therefore, ethnography was not appropriate for my research. In phenomenological design, a researcher focuses on the lived experience of human beings; usually, this design is suitable for relating the lived experience of individuals (Padilla-Diaz, 2015). A phenomenological design was not suitable for this study because my aim was not to study any lived experiences of participants. The aim of a narrative design is to reconstruct individuals' experiences into narratives (Franklin, 2012). I did not study the experiences of individual persons; therefore, a narrative design was not appropriate for

my research. Because I wanted to understand strategies to build innovative business models through in-depth inquiry, the research was of an exploratory nature. An exploratory study is useful when the researcher is unsure of the issue or problem; using an exploratory approach allows space for more inquiries into the research as new insights occur with data collection and analysis (Saunders et al., 2015). Yin (2018) suggested that findings from multiple case studies are considered compelling and more robust than those of single-case studies. Furthermore, the theory generated from multiple cases is typically more robust, generalizable, and testable (Eisenhardt & Graebner, 2007). Therefore, I used a multiple case study approach to explore the strategies that leaders of community energy use to create value through business models driven by innovation ecosystems and new ventures.

Research Question

What strategies do leaders of CECs use to create value through business models driven by innovation ecosystems and new ventures?

Interview Questions

1. What strategies did your community energy cooperative use to create value through business models driven by innovative ecosystems?
2. What strategies did you employ to address business model problems, such as collaboration, crowdfunding, and partnership?
3. How did you track the strategies' efficacy in creating scalable business models?

4. How did you mitigate resistance, within community energy, to implement new strategies?
5. How did you overcome any strategic challenge that you faced in a shared ownership model with private developers and local municipalities?
6. What additional information would you share about the strategies that you used within community energy to create successful business models driven by innovative ecosystems?

Conceptual Framework

I used a conceptual basis comprising two theories, (a) sustainable entrepreneurship (SE) and (b) the quadruple helix (QH) model. Elkington in 1997 developed the concept of SE based on a triple-bottom-line approach, which he showed underpins sustainable development through economic, social, and environmental value creation (Sarango-Lalangui, Santos, & Hormiga, 2018). Sustainable entrepreneurs create value beyond the limits of their enterprises and make positive contributions to social and ecological systems (Belz & Binder, 2017; Sarango-Lalangui et al., 2018). The concept of SE facilitates community leaders creating new business opportunities through innovative activities (Urbaniec, 2018).

The construct for the QH model is the triple helix (TH) innovation model proposed by Etzkowitz and Leydesdorff in the 1990s, which underpins technological innovation for a society driven by collaborative helices involving academia, government, and industry. In 2009, Carayannis and Campbell proposed the QH model by adding civil societies as a fourth helix in the innovation system. Based on the QH model, civil-

society-led community energy can drive the innovation process for new business ventures by adopting a collaborative approach.

The study's conceptual framework based on theoretical triangulation of SE and the QH model provided a lens to analyze the data from different perspectives.

Collectively, the composite conceptual framework facilitated an understanding of the findings from a qualitative multiple case study, which aimed at exploring successful strategies for value creation in CECs through business model innovations.

Operational Definitions

The terms defined in this section are relevant to business model innovation research in the community energy sector. I used peer-reviewed sources to support the definition of terms.

Business model: Business models represent mechanisms of value creation, capture, and delivery to customers (Schaltegger, Lüdeke-Freund, & Hansen, 2016). The business model in the renewable energy context, conceptualized by Herbes, Brummer, Rognli, Blazejewski, and Gericke (2017), represented value proposition, customer interface, related infrastructure, and revenue model.

Cooperative: Cooperative organizations operate based on a one member–one vote principle and promote shared ownership and collective business decision making (Huybrechts & Mertens, 2014).

Community energy: Community energy cooperatives include community members such as local bodies, farmers, individuals, and developers, who collectively

generate renewable energy and reinvest their profits into local communities (Strachan, Cowell, Ellis, Sherry & Brennan, & Toke, 2015).

Intermediary organizations: Organizations that represent community energy groups and play a prominent role in the support of the community energy sector, disseminate sector knowledge, and challenge policy constraints (Markantoni, 2016; Strachan et al., 2015).

Quadruple helix (QH) model: With a focus on cocreation of knowledge for regional innovation, this model presents a coevolution process driven by the interaction between (a) university, (b) industry, (c) government, and (d) civil societies (Carayannis & Grigoroudis, 2016).

Value proposition: In the context of renewable energy, the value proposition to consumers involves energy availability and affordability, transparent pricing, and sustainability of local communities (Hiteva & Sovacool, 2017).

Assumptions, Limitations, and Delimitations

Assumptions are untested concepts and ideas that researchers use to support their research, but that have not been validated or controlled (Pyrzczak & Bruce, 2017). To avoid misconceptions and distortion, researchers should highlight and discuss potential assumptions in their studies (Hager & Brudney, 2015). I identified three assumptions for this research. First, I assumed that the selected participants had sufficient experience with and knowledge about community energy business models to answer the interview questions. The second assumption was related to participant bias, which may occur when participants' accounts influence emerging constructs and thus have the potential to

disguise relevant data. The third assumption was that I achieved data saturation with nine interview participants from six CECs.

Limitations may impact the validity of the research (Pyrzczak & Bruce, 2017). Limitations are elements that can limit the scope of research and are beyond the control of the researcher (Yin, 2018). Energy policies are country-specific, and institutional support for community-energy companies varies widely across the European Union. I conducted this research study with a focus on the United Kingdom; therefore, the research findings may not be applicable to other European countries with different policy supports.

Delimitations define the boundaries of research by adding context to a study (Marshall & Rossman, 2016). Restrictions on geographic region, organization type, and business offerings narrowed the scope of this study. The delimitations of a study indicate the elements not included in the scope of the study (Bloomberg & Volpe, 2018). The scope of this research study was focused on community initiatives related to renewable energy systems; other types of sustainable development initiatives such as smart cities and electric transportation were beyond the scope of the study.

Significance of the Study

The research findings may help existing community energy leaders to create new business models for economic gains with social and environmental values. The leaders of CECs, using the findings from this study, may identify and explore (a) new business ventures in the areas of energy generation, energy storage, and other services such as

electric mobility and (b) new ways to develop partnerships to secure funds for project funding.

Contribution to Business Practice

Local energy policies play a significant role in the deployment of renewable energy; Germany feed-in tariff (FIT) support has been a catalyst for community energy growth (Hall et al., 2016). However, in recent years, policy changes leading to a reduction in FIT and other monetary subsidies have forced leaders of CECs to explore alternate financial instruments and business ventures. Due to a cooperative model, leaders in CECs can lack entrepreneurship traits such as (a) identify and create new business opportunities and (b) take and transfer business risks (Morrison, Ramsey, & Bond, 2017). A sustainable entrepreneurship approach can enable leaders of community energy to identify new opportunities within the space of sustainable development.

Leaders of CECs may take the role of local innovators and can collaborate with other members in business ecosystems to develop community-owned and self-contained renewable energy systems. Leaders of CECs can transform innovation into business opportunities, who act as a catalyst to drive growth and financial gains for community renewable energy by scaling up the process (Süsser, Döring, & Ratter, 2017). The research findings may provide a pathway for existing as well as new leaders in community energy businesses to understand and discern strategies to create value through innovative business models and make financial gains by scaling up their offerings in new geographic locations.

Implications for Social Change

In the role of sustainable entrepreneurs, the leaders of CECs can deliver a value proposition encapsulating environment, social, and economic elements to local communities. From a social change perspective, CEC leaders in the entrepreneurship role can alleviate energy deficiencies, promote sustainable development, and create employment opportunities for local communities through collaboration, empowerment, and enablement. Within the space of sustainable development, CEC leaders can extend their offerings by working with municipal bodies by assuming active roles in electric mobility and smart city initiatives.

Review of the Professional and Academic Literature

In this section, I critically review the literature on two distinct concepts—(a) SE and (b) the QH model—to support the conceptual framework of the study guided by theoretical triangulation. In the review, I cover various aspects of SE by comparing and contrasting it with other entrepreneurship theories such as social entrepreneurship, environmental entrepreneurship, community entrepreneurship, and institutional entrepreneurship. I also address various aspects of the QH-model-based innovation strategy, comparing and contrasting it with other innovation theories. I analyze different characteristics of community energy organizations, including their role, value proposition, organizational structure, ownership patterns, challenges, and barriers, as well as the current state of energy policy supports.

Search Strategy

The purpose of this qualitative multiple case study was to explore strategies that

leaders of CECs in the United Kingdom used to create value through business model innovations. I searched for articles from the Walden University Library using ProQuest, Business Source Complete, ABI Inform, EBSCOhost, Sage Premier, and Emerald Management databases. I used the following terms: *sustainable entrepreneurship*, *triple helix*, *quadruple helix*, *community energy*, *cooperative energy*, *community energy Europe*, *community energy the UK*, *business model innovation in community energy*, and *challenges in community energy business model*. I reviewed sources that included articles from scholarly peer-reviewed journals, research papers, and community energy sector reports by government and research organizations. I organized the literature review sources using a Microsoft Excel file, that enabled me to ensure that my sources met Walden University criteria specifying that 85% of references need to correspond to peer-reviewed articles published within 5 years of capstone approval by the university's chief academic officer (CAO). For each journal article, I recorded the journal title, digital object identifier (DOI), theoretical basis, research methodology, the population for data collection, analysis of results, conclusion, and implications for future research. Of the 74 references in the literature review, 68 correspond to peer-reviewed sources, representing 91.8% of all references, and 64 references correspond to works published within 5 years of expected CAO approval (April 2020), representing 86.4% of all references.

Sustainable Entrepreneurship Concept

With the beginning of the 21st century, the scope and purpose of entrepreneurship have grown beyond the limits of economic value to integrate societal and environmental aspects into the business proposition. The concept of SE, proposed by Elkington in 1997

based on a triple-bottom-line approach, indicates that sustainable development occurs through economic, social, and environmental value creation (Belz & Binder, 2017; Sarango-Lalangui et al., 2018). The innovativeness of sustainable entrepreneurs is the driving force for sustainable development; such entrepreneurs discover and recognize new market opportunities (Kraus, Burtscher, Vallaster, & Angerer, 2018). According to Urbaniec (2018), the concept of SE is still evolving; it facilitates business leaders' creation of new business opportunities through innovative activities.

Sustainable entrepreneurs create value beyond the limits of the enterprises and make positive contributions to social and ecological systems (Belz & Binder, 2017; Sarango-Lalangui et al., 2018). Sustainable entrepreneurs keep a focus on the local community, environment, and economy and therefore can recognize new business opportunities (Hanohov & Baldacchino, 2018). Sustainable entrepreneurs use innovation for new business opportunities at the nexus of social and environmental issues (Urbaniec, 2018). Entrepreneurs who develop sustainability-oriented new startups can create more radical sustainability-oriented innovations than larger incumbents do (Hörisch, 2015). Schaltegger et al. (2016) suggested that sustainable entrepreneurship is the result of the interplay between sustainable startups and large incumbents; sustainable startups create value through coevolution of innovative business models with mass-market players.

The concept of SE is relatively new. It has attracted the attention of the research community since the early 2000s; however, a significant rise in the number of publications on SE has occurred since 2006. Sarango-Lalangui et al. (2018) conducted a bibliometric study to measure the impact of published works on SE and suggested that

research work on SE gradually increased from 2006 to 2018. The research findings of Sarango-Lalangui et al. showed 18 published works on SE from 2006 to 2008, 43 works from 2009 to 2011, and a significant increase to 147 works on SE from 2015 to 2018. There are a multitude of definitions and terminologies of entrepreneurship that reflect efforts to resolve social and environmental problems; these include *ecopreneurship*, *environmental entrepreneurship*, *sustainable entrepreneurship*, *green entrepreneurship*, *institutional entrepreneurship*, and *social entrepreneurship*, each having distinct motivations and objectives (Sarango-Lalangui et al., 2018; Schaltegger & Wagner, 2011; Vuorio, Puumalainen, & Fellnhofer, 2018). In the next section, I compare and contrast SE with other types of entrepreneurship with the objective of distinguishing SE from other types of entrepreneurship in value creation.

Social entrepreneurship. Social entrepreneurs aim to solve societal problems and create shared value, while sustainable entrepreneurs contribute to solving societal and environmental issues through entrepreneurial activities (Gasbarro, Rizzi, & Frey, 2018). Traditional social entrepreneurship, grounded in not-for-profit perception, focuses on social value creation with nonmarket goals; on the other hand, sustainable entrepreneurs contribute to addressing societal and environmental problems with the realization of business success in the mass market (Schaltegger & Wagner, 2011). According to Belz and Binder (2017), most researchers in the area of social entrepreneurship are concerned with social issues, while some researchers also include environmental problems; consequently, Belz and Binder recognized the similarities between social entrepreneurship and SE. However, the sustainability orientation and need to create value

through business realization differentiate SE from social entrepreneurship. Belz and Binder (2017) suggested the following key difference between SE and social entrepreneurship: SE stems from sustainability developments and is focused on for-profit organizations and hybrid organizations, whereas social entrepreneurship mostly deals with nonprofit organizations.

Environmental entrepreneurship. *Ecopreneurship* or environmental entrepreneurship focuses on new business opportunities and the pursuit of market success through environmental solutions without any direct purpose to create social value (Belz & Binder, 2017; Schaltegger & Wagner, 2011). Schaltegger et al. (2016) highlighted the similarity between ecopreneurship and SE, suggesting that both types of entrepreneurs aim to work in the mass market using business ventures driven by innovative business models for sustainability. Based on the above discussion, I conclude that the SE concept is an amalgamation of values from (a) social entrepreneurship and (b) ecopreneurship. Social entrepreneurs consider the double bottom line of social and economic value, whereas ecopreneurs aspire to ecological and economic goals (Belz & Binder, 2017).

Institutional entrepreneurship. The concept of institutional entrepreneurship, proposed by DiMaggio in the 1980s, is based on the entrepreneur's use of strategies to create new institutional norms through collaboration and political tactics. DiMaggio showed that institutional entrepreneurs often build coalitions to legitimize and secure support for new institutions (Olsen, 2017). Institutional entrepreneurs from a sustainability perspective enable heterogeneous actors to challenge existing setups and collaborate to build new institutions (Jolly, Spodniak, & Raven, 2016). To bring out the

commonality between sustainable entrepreneurs and institutional entrepreneurs, I analyzed the action of the former in institutional settings with a focus on social and environmental value creation. Sustainable entrepreneurs are required to collaborate for collective goals, resolve conflicts, and create a cohesive network of entrepreneurs. Sustainable entrepreneurs take coherent measures and forge partnerships to build new institutions (Thompson, Herrmann, & Hekkert, 2015). Sustainable entrepreneurs take a politically active role to initiate institutional changes, engaging in actions that include garnering support, lobbying local authorities, and negotiating with policy makers (Thompson, 2018). Sustainable entrepreneurs prompt institutional change with a focus on a new value proposition and therefore overcome normative and cultural-cognitive institutional barriers (Gasbarro et al., 2018). Consequently, I construed that sustainable entrepreneurs and institutional entrepreneurs have a commonality in their actions in the institutional context related to sustainable development.

Community entrepreneurship. Community entrepreneurship, embedded in local communities, is another type of entrepreneurship that has similarities to sustainable entrepreneurship. Community entrepreneurship, a grassroots phenomenon, is often characterized by proactiveness, innovativeness, and social embeddedness and is generally practiced by business owners, individuals, and community leaders, who develop projects to resolve local community issues (Gurău & Dana, 2018). Community entrepreneurs use local networks and knowledge and behave entrepreneurially to bring social values to the local community; the social embeddedness approach stems from mutual trust and collaboration in community ventures (Vestrum, 2016). According to Gurău and Dana

(2018), despite the popularity of community-based entrepreneurship in the academic literature, its practice and application in sustainability-related projects are limited.

Community entrepreneurship is similar to SE regarding the delivery of social values to local communities. However, community entrepreneurs' role in addressing sustainability issues and creating profitable business models by partnering with market incumbents is unknown.

Having compared and contrasted SE with various entrepreneurship concepts, in the following section, I describe behavioral aspects of the SE process such as the competencies and traits of sustainable entrepreneurs.

Competencies and Traits in Sustainable Entrepreneurship

Opportunity recognition is an essential element in the practice of SE. According to Hanohov and Baldacchino (2018), sustainable entrepreneurs monitor trends and developments related to the environment and society in their areas and thereby improve their abilities to recognize new opportunities. Sustainable entrepreneurs create new opportunities for business development by using innovative activities at the nexus of environmental and social issues (Urbaniec, 2018). According to Belz and Binder (2017), recognizing a social or ecological opportunity and developing a solution constitute a crucial phase in the SE process. Sustainable entrepreneurs identify new business opportunities by filling the market gaps left by large incumbents in the areas of social and environmental goods and services (Gasbarro et al., 2018).

Opportunity creation. Sustainable entrepreneurs extend their business areas to discover and capitalize on new opportunities (Kraus et al., 2018). Recognizing that

opportunity realization and risk-taking abilities are complementary to each other, Thompson et al. (2015) suggested that sustainable entrepreneurs, as institutional change agents, create collaboration to distribute and share business risks. Sustainable entrepreneurs take calculated risks to exploit new opportunities, even though the SE process is slow to generate a return on investment (Kraus et al., 2018). The sustainable entrepreneur, guided by intrinsic values, is an independent, innovative, and moderate risk taker (Vuorio et al., 2018).

Innovativeness. Innovativeness is another important element in SE practice. Innovation based on proactivity is a driving force for the formalization of SE (Kraus et al., 2018). Sustainable entrepreneurs use innovative practices to gain legitimacy within normative, cultural-cognitive, and regulative institutions (Gasbarro et al., 2018). Sustainable entrepreneurs consider innovativeness to be an essential factor in the sustainability transition, and they support technological improvement for the proliferation of SE (Urbaniec, 2018). In the multilevel model of low-carbon-energy transition, innovative sustainable entrepreneurs are pulled into the meso level by public authorities and large market incumbents to take part in a coevolution process of energy transition (Gasbarro, Annunziata, Rizzi, & Frey, 2017).

Collaborations. Sustainable entrepreneurs take steps to forge new partnerships to challenge existing institutions or create new institutions (Sarango-Lalangui et al., 2018). Sustainable entrepreneurs are described as change agents due to their disagreement with the existing paradigm and institutional settings (Kraus et al., 2018). Sustainable entrepreneurs act as institutional entrepreneurs to change the current business

environment and influence regulations, societal norms, and normative values (Gasbarro et al., 2018).

Local embeddedness. The SE process is embedded in the local community (Sarango-Lalangui et al., 2018). Sustainable entrepreneurs are fixed in local business, who promotes transparency to gain legitimacy with local communities and citizens (Gasbarro et al., 2017). Through bottom-up action, sustainable entrepreneurs mobilize local communities for consensus building through lobbying (Gasbarro et al., 2018). Building on analysis of existing literature, I posited that key elements that guide the process of SE are (a) opportunity recognition, (b) innovativeness, (c) change initiatives, (d) risk taking, and (e) local embeddedness. Sustainable entrepreneurs have competencies and traits that guide their actions to create values in sustainable projects. Thompson (2018) highlighted that sustainable entrepreneurial behavior in an institutional context has received limited focus in previous research studies. Sustainable entrepreneurs are driven by personal values; the strategic actions taken by them reflect intrinsic values and beliefs (Kraus et al., 2018). The altruistic values of entrepreneurs, guided by the SE concept, motivate them to work for the objective of triple value creation (Vuorio et al., 2018). In the subsequent section, I elaborate the competencies and practices of sustainable entrepreneurs.

Drivers. Policymakers recognize the contribution of sustainable entrepreneurs regarding knowledge and values and therefore involve them as essential partners in the energy transition process (Gasbarro et al., 2017). Vuorio et al. (2018) examined the drivers in SE and found that (a) attitude toward sustainability and (b) perceived

entrepreneurial desirability may significantly impact the sustainable entrepreneur's intentions. Koe, Omar, and Sa'ari (2015) carried out a quantitative study to determine the factors that influence propensity toward SE practices in Malaysian small and medium-sized enterprises (SMEs) and found that (a) a sustainable attitude and (b) perceptual factors such as perceived desirability and perceived feasibility have a significant impact. Thompson (2018) studied the behavior of sustainable entrepreneurs in biofuel ventures in the Netherlands and found that entrepreneurs use a combination of rhetorical, reconciliatory, and institutional change strategies to legitimize business ventures. Sustainable entrepreneurs' openness and propensity toward long-term community benefits can positively influence business performance (Soto-Acosta, Cismaru, Vătămănescu, & Ciochină, 2016). Sustainable entrepreneurs take part in sustainability movements to hone their knowledge and skills in relation to new business opportunities (Hanohov & Baldacchino, 2018). Having analyzed the behavior, attitude, and traits of sustainable entrepreneurs influencing their actions toward SE practices, in the subsequent section, I explain the relevance of SE practice in community energy initiatives.

Sustainable Entrepreneurship in Community Energy Initiatives

Low-carbon-energy transition poses social and technical challenges, and therefore, should be viewed from a socio-technical perspective. The green technologies, often socially shaped through the interaction of heterogeneous actors at multiple levels, necessitate the transformation of institutions involved in economic activities (Smith, 2016). The low-carbon-energy transitions require building new sociotechnical systems where green technologies are part of normative behavior (Valkenburg & Cotella, 2016).

Geels et al. (2016) studied low-carbon transition from a multi-level perspective (MLP) and suggested dynamic interactions of a) actors and social groups, (b) rules and institutions, and (c) technologies shape energy transition pathways. According to Smith (2016), sustainable developments require realignment and restructuring of social, economic, and political powers through institutional changes. Hörisch (2015) analyzed the role of sustainable entrepreneurs through the lens of MLP and suggested that sustainable entrepreneurs have the potential to move innovations from the niche to the regime level by putting pressure on incumbents and public authorities. Gasbarro et al. (2017) analyzed the role of sustainable entrepreneurs in a multilevel model of the low-carbon-energy transition and found sustainable entrepreneurs co-create new societal regimes, co-evolve new institutional arrangements, and co-create new markets. Having analyzed various aspects of the SE concept, in the subsequent section, I discuss and analyze different elements of the quadruple helix (QH) model of innovation.

Quadruple Helix Model as Innovation Strategy

As a paradigm shift in the innovation process, organizational leaders in the 21st century, have switched their focus from supply-side innovation to demand-side innovation driven by external knowledge. The primary purpose of the externally focused innovation is to address complex social-technical problems by breaking down silos between participants such as industries, governments, and universities. According to van Waart, Mulder, and de Bont (2016), the triple-helix model based on the relationship between government, industry, and university can play an active role in the generation and diffusion of shared knowledge in innovation processes. The triple helix model,

proposed by Etzkowitz and Leydesdorff in 1995, based on the relationships between three elements (university, government, and industry), is used for innovation and economic development in many European countries (Galvão, Mascarenhas, Rodrigues, Marques, & Leal, 2017). Werker, Ubacht, and Ligtvoet, (2017) used the triple helix model to study the role of entrepreneurs in the Dutch energy market and found entrepreneurs from the industry, government, and academic sectors with different functions, knowledge, and incentives collaborate to drive market innovations.

Recognizing the driver role of citizen groups in circulation and diffusion of knowledge, Carayannis and Campbell in 2009 proposed the QH model by adding citizens as a fourth helix. According to Carayannis and Grigoroudis (2016), citizen groups in QH models take an active role in driving innovation processes and seek support from the other three actors (industry, academia, or government). Rustiadi, Kusumahdinata, Rahman, and Arsandid (2018) highlighted the importance of social capital in building trust, mutual understanding, and solidarity between the actors of the QH collaboration model.

Intermediary organizations led by civil societies play an essential role to bridge the gap between different actors in the QH model and use their social capital to create shared knowledge (Van Horne & Dutot, 2017). Having understood the basic structure and purpose of the QH model, I compare and contrast the QH model with other contemporary innovation models in the subsequent section.

Open innovation concept. Chesbrough proposed the concept of open innovation (OI), which business leaders used to develop an external ecosystem of firms and purposively utilized knowledge and innovation for commercial success. Individual firm

leaders use the OI concept to create shared value by capturing values from different firms in the alliance (West & Bogers, 2017). Business owners guided by OI strategies create knowledge-based partnerships with the help of external elements such as consumers, suppliers, universities, or public authorities (Greco, Locatelli, & Lisi, 2017). Although, the scholars showed the concept of the OI model stems from a collaboration between external actors for new knowledge creation, however, the purpose of this model is the commercialization of external knowledge (Aloini, Farina, Lazzarotti, & Pellegrini, 2017). Additionally, the researchers showed that the OI model primarily focuses on actors involved in the innovation process related to technology intensive sectors (West & Bogers, 2017). According to Marcolin, Vezzetti, and Montagna (2017), the core aims of OI are (a) customers' expectation, (b) access to new markets, (c) shared risks with other firms, and (d) competitive advantage through technological scouting. Conversely, researchers argued that the QH model provided insights into the knowledge dynamics of socio-technical changes involving industries, government, universities and civil societies on the complex transition process (Van Horne & Dutot, 2017). Based on the above analysis, I concluded that business owners use the OI model for knowledge development with a purpose to gain a competitive advantage in the market, whereas, the QH model used for knowledge development in the social-technical setting around the multi-actor transition path.

Living lab concept. The living lab concept, proposed by Massachusetts Institute of Technology (MIT) in 2010, is a contemporary form of open innovation which involves stakeholders for co-evolution of knowledge in a real-life environment. The primary

objective of a living lab is to co-create an innovative solution with the end users; in this process of innovation, users are engaged in all the development phases and have decision making power (Steen & van Bueren, 2017). In the living lab, the end users are involved as a critical stakeholder and take part in co-creation of knowledge in a community setting (Gryszkiewicz, Lykourantzou, & Toivonen, 2016). Researchers have highlighted complexity associated with the living lab implementation. In an research on living lab challenges in the Amsterdam city, Steen and van Bueren (2017) found that out of five phases (research, development, testing, implementation, & commercialization) of living labs some aspects were not incorporated; additionally, they found user engagement took place in only 51 of the 90 urban innovation projects. In contrast to the OI model, living lab innovators do not focus on intellectual properties or patents, which results in increased collaboration and motivation required to address complex problems (Gryszkiewicz et al., 2016). The living lab innovators physically located in cities fail to capture the real-life context due to controlled environment; many sustainable innovation initiatives fail to get commercialized and make positive impacts due to incomplete living lab designs (Steen & van Bueren, 2017).

In contrast to living labs, members of the civil society and other local actors of rural areas, as part of the fourth helix in QH, significantly contribute to regional innovation with their local knowledge (Kolehmainen et al., 2016). Guided by QH models, government authorities and industry leaders promote the direct involvement of local communities in the regional innovation process due to their knowledge on local issues (Carayannis & Grigoroudis, 2016). Based on the above analysis, I found that the living

lab concept based on urban settings may not reflect a real-life context. On the other hand, local communities and citizen groups, as part of the fourth helix, can add real-life perspective in the innovation process due to their embeddedness in the complex problem. Having analyzed the basic purpose of contemporary innovation models, in the subsequent section, I elaborate the role of QH model in entrepreneurship and value creation.

Entrepreneurship and collaboration. Dubina et al. (2017) analyzed spatial innovation and entrepreneurial activities through the lens of the QH model and suggested the knowledge society, created as a result of interplays within the QH model, drive spatial innovation and the entrepreneurial ecosystem. Gouvea, Kassicieh, and Montoya (2013) used a QH model to study economic synergies and suggested that business owners rely on the QH model to promote joint ventures to reinvigorate value chain networks of technology, product, and services. Pisano, Ferrari, and Fasone (2016) used the QH model to study a business model of organizations with an aim to identifying business opportunities and creating values through an entrepreneurial network of actors. Pisano et al. argued the overall value proposition of such business models is the result of individual values of partner networks.

Commercialization of innovation. As part of an entrepreneurship building process, academic startups, promoted by universities, use QH models to access external resources and new business opportunities to commercialize innovations (Parente, Feola, Cucino, & Catolino, 2015). García-Terán and Skoglund (2018) used the QH model to analyze the commercialization and diffusion of renewable energy technologies and argued that the interplay among different actors forms a basis of funding and

commercialization of new technologies. In innovation-driven economies, Galvão et al. (2017) showed QH models play an important role in stimulating entrepreneurship and innovation. Building on the analysis of seminal research related to the application of the QH model in regional entrepreneurship developments, I found the QH model can help leaders to create (a) network for entrepreneur to commercialize innovations and (b) platform to exploit resources and gain legitimacy. I also gained key insights into the challenges associated with the successful implementation of the QH model. Having analyzed the role of the QH model in supporting the entrepreneurship process, in the subsequent section, I elaborate elements of the QH model.

Elements of QH Model

Previous scholarly researchers showed the QH model is a regionally focused and collaboration driven innovation system. Kolehmainen et al. (2016) stated the QH approach could be successfully applied to promote knowledge development and innovations in remote and rural areas lacking resources. Municipalities, researchers, consultants, and civil groups driven by QH models can collaborate to implement regional innovation projects (García-Terán & Skoglund, 2018).

Intermediary organizations. Intermediary organizations as part of the fourth helix bridge the knowledge gaps among the underdeveloped regions and connect them to larger innovation networks (Nordberg, 2015). The consumer and citizen organizations are generally considered to represent the fourth helix of QH models; conversely, what constitutes the fourth helix is somewhat confusing and unclear to many researchers (Björk, 2014; Nordberg, 2015). In contrast to the simple definition of the fourth helix as

civil society, Lindberg, Lindgren, and Packendorff (2014) alternatively conceptualized the fourth helix as nonprofit organizations, small ventures, and entrepreneurs extending their contributions beyond the limits of commercial enterprises and political institutions. Björk (2014) also conceptualized the fourth helix as intermediary organizations such as citizen groups, associations, NGOs, and research institutes. Researchers have alternatively conceptualized the fourth helix as the fourth pillar organizations (MacGregor, Marques-Gou, & Simon-Villar, 2010), intermediary organizations (Nordberg, 2015; Van Horne & Dutot, 2017) or anchor organizations (Pisano et al., 2016). The fourth helix organizations are community driven nonprofit organizations that play an important role of boundary spanners and bridge building among three actors (government, industry, and university). The leaders of the intermediary organizations create common languages and transform individual actor values into the shared value of innovation (Van Horne & Dutot, 2017). The leaders of fourth pillar organizations enable the innovation process by bringing together different actors of common interest; they act as catalysts for the shared innovation and knowledge development (MacGregor et al., 2010). According to Nordberg (2015), intermediate organizations as part of the fourth helix can have a greater influence on the innovation process of smaller towns than they can have in metropolitan regions.

Social capital. Business leaders use social capital, an essential element in the QH model, to foster shared value through relationships and networks within a diverse social group. Business leaders utilize social capital to transfer knowledge and technology through the aggregation of resources possessed by individual organizations (Van Horne

& Dutot, 2017). According to Rustiadi et al. (2018), business leaders, with the help of social capital, drive economic activities and collaborate for knowledge creation.

MacGregor et al. (2010) empirically analyzed the role of the QH model in fostering innovation ecosystems in organizations and found that business leaders, supported by social capital, can stem local cooperation and create shared values in the business.

Having analyzed characteristics of the QH models, I concluded that the QH innovation model is a regionally focused initiative that is driven by citizen organizations representing the fourth helix. Additionally, business leaders use social capital to facilitate knowledge transfers through networking and relationships. In the subsequent section, I analyze the application of the QH model in supporting community energy initiatives.

QH Model in Community Energy Initiatives

The energy systems in the Western-European countries have gone through institutional changes; the decentralized and distributed models of local energy producers have gradually replaced the centralized model of large energy companies. The institutional and technological changes in energy sectors necessitate a collaborative approach; under the triple helix model, entrepreneurs with diverse roles, resources, knowledge, and incentives, drive the innovation process for the value creation in energy systems (Werker et al., 2017). Green technological adoption and diffusion require the creation of green QH clusters that necessitate institutional changes to achieve innovations and new business models (Gouvea et al., 2013). Researchers have studied energy transition strategy in Germany, known as Energiewende, to understand the dynamics of institutional reconfiguration from a social-technical perspective. Researchers have shown

that Germany's Energiewende strategy has provided a space for local actors to take part in the energy transition process and stimulated growth in renewable energy production in the rural areas (Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015). The assemblage of diverse actors such as local communities, researchers, investors, and farmers in the renewable energy landscape necessitates institutional changes to accommodate them in the social-technical energy regime. Moss, Becker, and Naumann (2015) stated the policymakers in Germany through Energiewende stimulated institutional changes by mixing top-down policy and bottom-up initiatives; such institutional changes resulted in a heterogeneous network of local actors working for collective ownership. The civil society led CECs require a polycentric approach to recognize the role of different actors in the business ecosystem; the leaders of CECs, utilizing this business ecosystem, setup renewable energy projects (Berlo, Wagner, & Heenen, 2017). The low-carbon transition policymakers, to create value for communities, promote knowledge exchange between different actors of business ecosystem (Hoppe et al., 2015). Due to eco-innovation peculiarities, community groups play a critical role in shaping institutional arrangements; the leaders of such groups mediate between industry, government, and universities to drive social and institutional changes for value creation (Yang & Egelund Holgaard, 2012). Clearly, the above analysis of citizen-led low-carbon transition highlights the key role of community energy leaders in creating institutional changes to accommodate multiple actors of the business ecosystem. Therefore, I concluded that the business leaders of community energy, as the fourth element of the QH model, can overcome the challenges on the low-carbon transition trajectory through collaborations within the

business ecosystem. Having critically reviewed the QH model in this section, and sustainable entrepreneurship in the previous sections, I elaborate different elements of CECs in the following section. The critical review included the role, value proposition, organizational structure, ownership patterns, the current state of energy policy supports, challenges, and barriers.

Community Energy Organizations

Leaders of European countries have envisioned decentralized and democratically controlled renewable energy systems through citizen engagements. Since 2010, countries such as Belgium, Denmark, Germany, Netherlands, United Kingdom, and Sweden have shown their interest in supporting collective ownership of renewable energy systems through community energy (Saintier, 2017). The leaders of community energy groups promote small scale and democratically governed renewable energy projects; also, such groups, based on a cooperative model, act as social enterprises having both profit and nonprofit purpose (Becker et al., 2017). The emergence of community energy groups is the result of consumer dissatisfaction resulting from the monopoly of incumbent large energy companies responsible for nontransparent and complex pricing mechanisms (Huybrechts & Mertens, 2014). Becker et al. (2017) analyzed community energy initiatives from the lens of social entrepreneurship and showed CECs exhibit environmental and social motives by providing democratic ownership of energy generation.

Role and purpose. Community energy business owners have both profit and nonprofit motivations; the nonprofit purpose includes energy saving, sustainability

development, local embeddedness, and citizen participation (Vancea et al., 2017). In addition to energy generation, community energy business leaders take a significant role in eradicating fuel poverty and reducing energy consumption through citizen consultation and education (Saintier, 2017). In contrast to large energy company leaders, Huybrechts and Mertens (2014) stated the community energy leaders work to reduce information asymmetry in the energy market by advising citizens about ways to reduce energy consumption, therefore, enhancing credibility and trust. After discussing the purpose and motive for community energy, I discuss the business structure and ownership pattern of community energy in the following section.

Business Structure of Community Energy

Community energy is a pluralistic sector that includes different technologies, institutions, business models, goals, and actors. Civil society groups adopt a cooperative structure to run CECs (Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014; van Veelen, 2017). There are several different forms of community energy organizations; the most common type is a cooperative model operated by one member one vote logic to promote democracy in decision making (Becker et al., 2017). Cooperative models of community energy organizations, driven by a pluralistic group of citizens, are effective in building consensus within the community to overcome any local opposition to RE projects, especially for windmill projects that have faced local resistance in many European countries (Huybrechts & Mertens, 2014). In addition to the democratic control of energy generation, the citizen-led cooperative model aims to reduce energy prices, energy consumption, and bring transparency in the cost structure. Huybrechts and

Mertens (2014) argued that cooperative business owners could reduce the cost of capital and other transactional costs by mobilizing nonmarket resources through voluntary supports of cooperative members. However, Huybrechts and Mertens (2014) cautioned that due to the democratic structure, cooperative models could suffer from a slow decision-making process.

Ownership pattern. The ownership pattern based on cooperative models are the most common form of community energy in European countries such as Germany, Denmark, and the Netherlands; however, researchers have highlighted the emergence of new hybrid structures (Saintier, 2017; Vancea, et al., 2017). The hybrid forms include (a) shared ownership between community energy and a private developer, (b) partnership with local municipalities or city council, and (c) multi-nested network of CECs with a common mission and vision. Vancea et al. (2017) showed the emergence of a multi-nested CECs structure comprising of cooperatives and private associations, where each entity has specific attributes to create social and economic values. According to Saintier (2017), the shared ownership model between local communities and private developers, proposed by the United Kingdom's renewable energy policymakers in the year 2014, aimed to create a shared revenue stream or a joint venture to bring social values to local communities. Becker et al. (2017) reviewed the communities of interest concept and empirically showed that CECs (a) Som Energia, Spain and (b) Retenergie, Italy operated beyond their locality by creating a network of renewable projects to scale up social entrepreneur activities. Vancea et al. (2017) highlighted Berlin energy roundtable, a public electric grid operator company based on the partnership between citizen groups

and local municipalities in Berlin, that allows citizens to take part in the decision-making process through voting rights.

Shared ownership. The business structure of community energy depends on various parameters that include social-technical configuration of the region, local energy policy, and regulations. van Veelen (2017) found that cooperative based CECs comprise a smaller portion of energy generation organizations in the United Kingdom when compared with other European countries. Strachan et al. (2015) stated the most common form of CECs in the United Kingdom is a joint ownership venture with commercial developers; such organizational structures provide an avenue for replication and up-scaling of community energy projects. The business structure of community energy in the United Kingdom is entrepreneurially inclined compared to other European countries; such structure allows business leaders to secure development funds from members against shares (van Veelen, 2017). Community Energy England (2018) reported Community Benefit Societies (CBS) is the most dominant form of business structure used by 47% of community energy organizations, while bona fide cooperatives based organizations are just 19%. Brauholtz-Speight et al. (2018) stated the cooperative and Community Benefit Society Act 2014 in the United Kingdom necessitated new CECs register as CBS rather than as bona fide cooperatives; CBS based community energy business leaders extend their offerings to a wider community and reinvest their profits into the entrepreneurial activities. Hiteva and Sovacool (2017) discussed Community Interest Company (CIC) another type of hybrid business structure in the United Kingdom, the leaders of which focus on social purpose and reinvest their profits into the

local communities, providing memberships, promoting transparency while their assets remain in the locked state. Brauholtz-Speight et al. (2018) stated CIC organizations operate for social purpose and develop community engagement by issuing shares or bonds. Brauholtz-Speight et al. also suggested the new business structures based on CBS and CIC concepts help business leaders of community energy focus on aligning their business objectives with mission statements. Markantoni (2016) stated the low-carbon transition is a co-evolutionary process where organizational and institutional changes take place as policies evolve continuously due to the changes in the society. Therefore, I conclude that the emergence of the hybrid business structure of community energy in the United Kingdom is a result of a complex interaction between institutions and policy governance. Having discussed the emergence and evolution of community energy business structure in this section, I discuss the role of different actors and intermediaries in shaping the community energy sector in the following section.

Intermediary Organizations in Community Energy

The community energy sector is nascent and evolves with the social-technical regime driven by multilevel interaction between actors, institutions, and markets. While the local governments provide top-down support to community energy, the nonstate actors in the form of intermediary groups fill-in any policy gaps by sharing information and fostering cooperation, also such groups speak up for local communities and challenge structural constraints (Markantoni, 2016). Seyfang et al. (2014) highlighted the prominent roles of intermediary organizations in support of community energy that includes (a) managing and evaluating project financing models, (b) providing resources to new and

ongoing projects, (c) building networks of community groups, and (d) interfacing with policymakers. In the U.K. context, Community Energy England (2018) stated intermediary organizations provide development support, project management, administrative services, and funding advice to individual CECs who are the members of such intermediaries. As part of the innovation management process, knowledge generated at the local level is pulled up by intermediary organizations and shared with policymakers and other network actors, while, best practices and lessons learned elsewhere are pushed down to local communities (Seyfang et al., 2014). The United Kingdom's Department of Energy and Climate Change (2015) in their support strategy emphasized the need for intermediary driven common platforms for community energy groups and other stakeholders to exchange knowledge through workshops and social networks.

Evolution of Social-Technical Regime

The governance of low-carbon transition is a multi-level and co-evolving process involve a complex interaction between actors, institutions, and technologies; therefore, policy enactments by regional authorities should recognize such elements and their interactions (Markantoni, 2016). The energy system based on the socio-technical regime is considered dominant due to technology lock-ins, normative practices, and dependency over large scale energy provisions (Strachan et al., 2015). Due to the dominant nature of the socio-technical regime, policy enactment by authorities require to reconfigure and reorient the existing regime to accommodate new entrants, technologies, and institutions. Geels et al. (2016) suggested during reconfiguration and reorientation of the existing regime, the new entrants push innovative technologies and create institutional changes to

challenge incumbents. The mix of technology-push and demand-pull policy is an effective strategy to accommodate community energy into the existing energy regimes (Markantoni, 2016). Different transition pathways enact the growth of renewable energy in different European countries. Geels et al. (2016) compared and contrasted low carbon transition pathways between the United Kingdom and Germany, and showed the German transition followed a technological substitution pathway where new entrants representing civil societies and cooperatives deploy decentralized renewable energy.

Conversely, Geels et al. (2016) stated the U.K. low carbon transition followed a transformation pathway where incumbent actors supported by market based policy built centralized and large-scale renewable energy, leaving limited market space for new entrants. Since 2010 there is a proliferation of small-scale renewable energy projects in the United Kingdom; however, the dominant mode of energy provisioning remains locked-in to centralization promoted by large energy companies (Strachan et al., 2015). In the United Kingdom, community led renewable energy projects have a small share in energy production compared to large utility companies that hold over 90% of the total energy market (Markantoni, 2016). However, the dominant issues like carbon neutrality, energy security, and the public pressure for democratic governance of energy systems have influenced the U.K. energy policy. In 2014, the U.K. government recognized community energy as a new policy tool to achieve low-carbon targets and formulated a strategy to allow citizen participation in renewable energy systems (Markantoni, 2016; Seyfang et al., 2014).

Policy Support in the United Kingdom

It is crucial to analyze the distinct features of the United Kingdom's community energy policies such as (a) asymmetrical support, (b) unreasonable focus on the market, and (c) unavailable funding sources. A Community Energy England (2018) report highlighted that community energy in the United Kingdom is negatively impacted due to lack of local and state supports, access to expertise, and funding. Country-specific community energy policies in England, Wales, Northern Ireland, and Scotland have resulted in the dissimilar effect on the success of community energy initiatives. The asymmetric proliferation of CECs within the member states of the United Kingdom suggests a gap in community energy policy enactment. The Scottish community policy support, Community and Renewable Energy Scheme (CARES), have provided strong momentum to community energy in Scotland. However, such supports are not evident in England, Wales, and North Ireland. The community energy policy enacted by the U.K. central government applied to all member states. However, the development of community energy has been more prominent among the devolved governments, especially in Scotland (Strachan et al., 2015). The devolution of power has allowed Scottish policymakers to gain control over planning and discretionary funding at the regional level to create new opportunities for community energy through bottom-up engagement and funding support (Markantoni, 2016).

In the United Kingdom, Scottish policymakers reconfigured the existing socio-technical regime to accommodate entrants from the community energy sector, and thereby, supported the development of new coalitions and networks to put pressure on the

dominant socio-technical regime (Strachan et al., 2015). U.K. policy makers, guided by the liberal market economy, prefer market-based and non-technology specific policy instruments such as Renewables Obligation (RO) which can raise the barriers to new entrants, while incumbents continue to enjoy market proximity (Geels et al., 2016). Market-based policy instruments such as RO and Contracts for Difference (CfD) can improve revenue visibility to large companies; however, higher transactional costs, price escalation risks, and complex partnerships pose an obstacle to new community energy entrants (Strachan et al., 2015). Financial investors favor large corporations over small scale businesses in the U.K. market-based economy. Hall et al. (2016) highlighted institutional financial advisors in the United Kingdom's market-based landscape do not provide support to small scale renewables. A report by Community Energy England (2018) suggested access to cheaper project finance was considered a significant hindrance by community energy groups in 2017; lack of government-backed funding schemes, complicated procedure, and lack of knowledge about development funding are primary concerns in England. Hall et al. (2016) contrasted financial institution support between Germany and the United Kingdom. Hall et al. showed that the low-carbon transition path pursued by the U.K. government relied on the competitive market based financial instruments; while in Germany, which is a coordinated market, banks played an essential role in funding the civil energy sector. Due to the absence of financial support to small scale renewable energy projects, business leaders of CECs look for alternate sources of funding. The United Kingdom's Department of Energy and Climate Control (2015) stated among other types of funding options, crowdfunding from motivated

individuals and community funding from residents have emerged as alternative ways to raise fund for community energy projects. Dilger, Jovanović, and Voigt (2017) suggested crowdfunding driven by altruistic motives has emerged as a popular method of fundraising in urban Europe; the equity-based options permitting individuals to gain membership of energy cooperatives, are the most prevalent. According to Brauholtz-Speight et al. (2018), business leaders of community organizations provide security to funders in the form of community shares; individual members, regardless of the number of shares, are given voting rights in the decision-making process. Building on the analysis, I can construe that the United Kingdom's community energy sector is in the inception stage; it is also evident that the policy supports to the community energy sector in the United Kingdom are evolving. In addition to observing a gap in policy support to the community energy sector, I also noted that the present community energy landscape in the United Kingdom fails to provide skills, knowledge, and social capital required for community energy project development (Strachan et al., 2015). The community energy sector in the United Kingdom faces a professional skill shortage in the area of carbon audit, project management, and negotiations; intermediary organizations take an active role to fill-in such gaps (Seyfang et al., 2014).

Recognizing the potential of community energy organizations, the U.K. government has attempted to strengthen this sector through new policy interventions such as (a) shared ownership models (Saintier, 2017) and (b) community benefit societies (van Veelen, 2017). According to the United Kingdom's Department of Energy and Climate Change (2015) the shared ownership legislation enactment in 2015 intend to foster

innovation; community groups, under this legislation, are allowed to have a shared ownership opportunity with a commercial developer in the new renewable projects. Conversely, unlike traditional cooperatives, CBS issues membership shares to investors in exchange for project funding instead of relying on commercial loans; the CBS model focuses on the benefit of a wider community, rather than its members (van Veelen, 2017). Having recognized the limitation of the bona fide co-operative structure, in 2014 the United Kingdom's Financial Conduct Authority (FCA) mandated that all new community energy companies follow a CBS model (Community Energy England, 2018). The main objective of the CBS model is to promote entrepreneurship by allowing community energy to sell electricity to the national grid and reinvest their profits into business; the CBS model can provide a viable source of revenue and long-term benefits to the community groups (Braunholtz-Speight et al., 2018). The subsidy in the form of Feed-in-tariff (FIT) abolished from March 2019 posed a significant challenge to small community energy generators; however, the sector outlook remains positive through the adoption of new technologies and innovative business models (Community Energy England, 2018). With rising challenges, community energy business leaders continue to innovate new business models without depending on government support; such emerging models can set new norms for the sector, also, such models can be replicated around the world by community groups (Green Alliance, 2019). Community energy business leaders take the role of entrepreneurs as they use knowledge, resources, and networks to create value; the leaders overcome market challenges by adapting to technological innovations, hybrid organizations, and new business models (Hoppe et al., 2015). According to Evans et al.

(2017), organizational leaders exchange both tangible and intangible values and deliver social, environmental, and economic goals collectively through innovative business models stimulated by value networks of different roles and interactions. Hoppe et al. (2015), in a comparative case study on civil society led companies a) Saerbeck, Germany, and b) Lochem, Netherlands, showed organizational leaders develop networks, manage social expectations, and promote learning. Hoppe et al. highlighted an essential role of intermediary agents who negotiated and mediated between actors to support local energy initiatives and resolve problems. Dilger et al. (2017) suggested intermediary organizational leaders speak up for local communities and challenge current institutional arrangements in the energy regime. Having analyzed the current socio-technical energy regime and recognized the scope for entrepreneurship in the United Kingdom's community energy sector, in the following section, I explore the value proposition the business leaders of CECs can offer to wider communities based on new business models of collective ownership and collaborations.

Potential Value Proposition

Energy efficiency and affordability have emerged as a potential area for value creation; community energy led by civil society can differentiate themselves from mainstream market players by working with local communities in energy efficiency initiatives. The large incumbent energy company leaders lack incentives to provide energy efficiency services to their customers as such actions could reduce their turnover; conversely, cooperative energy leaders in line with their mission can help local communities to adopt to energy saving practices (Herbes et al., 2017). Hiteva and

Sovacool (2017) used principles of energy justice to study the potential opportunities for business model innovations in CECs and found business leaders inherently integrate energy justice elements into their value proposition. The traditional community energy business model is based on energy generation; conversely, the supply side initiatives such as energy efficiency and demand side response can be a new value proposition to incentivize consumers by lowering their energy demand during peak hours (Braunholtz-Speight et al., 2018). In a shift from their core business, community energy leaders can provide energy efficiency consultancy to local communities, private companies, and municipalities; such services can result in higher revenue when fees are charged on per unit of energy saved (Herbes et al., 2017). The sector report by Community Energy England (2018) showed that in 2017, 76 out of 302 community energy leaders offered energy efficiency or demand management services to 84,000 community members. Therefore, from the literature review, I observe that the energy efficiency and demand management services are a potential value proposition that can be offered by community energy business leaders.

Selling green energy to private consumers and community members is a viable business model for most energy cooperatives. The localized energy generation and consumption through private networks mean that the suppliers can avoid supply and distribution charges payable to grid operators. Community energy organizational leaders use social networks to develop their consumer base; also, such consumers show willingness to pay a premium for green energy (Herbes et al., 2017). Hiteva and Sovacool (2017) highlighted Robin Hood energy, a wholly owned company of Nottingham city

council, sells electricity to households at lower tariffs, and therefore, captures value by supplying power to vulnerable consumers and alleviates fuel poverty. Several community energy business leaders throughout the United Kingdom are currently exploring the feasibility of peer-to-peer trading, a platform-based trading model that provides simpler and cost-effective means of localized energy generation and usage (Community Energy England, 2018). Renewable energy systems are vulnerable to weather changes such as changes in wind velocity and overcast conditions; therefore, energy storage as a backup system is vital to improving the reliability of renewable energy systems. Energy storage systems can be a new proposition for the business leaders of community energy (Süsser et al., 2017). Furthermore, the concept of behind the meter (BTM) activities allows commercial leaders to generate their green energy within their premises. Commercial owners can use the energy storage solutions, provided by community energy, as part of BTM to consume stored energy during peak-time and feed into the grid during off-peak times. Small innovators and technology solution providers are poised to use BTM solutions as a promising business opportunity. Community energy leaders in the United Kingdom have developed many energy storage projects, among them is a partnership of Tesla energy storage installed by the Bristol Energy cooperative; the BTM concept permits avenues for technology deployment to support new business models (Community Energy England, 2018). Community energy leaders can explore new business opportunities in Electric Vehicle (EV) infrastructure. According to Green Alliance (2019), there are 160,000 EVs in the United Kingdom which is expected to reach a million by the year 2020; with falling technology costs, community energy leaders can

explore new business models involving technology partners in the areas of electric charging and energy storage. A Community Energy England (2018) survey report showed around 10 business leaders of CECs were interested in services related to community EVs in their future business plans. Herbes et al. (2017) showed a willingness of community energy business leaders in exploring EV-related services such as (a) charging infrastructure, (b) fleet ownership, and (c) shared transport for community members.

Business Model Innovations in Community Energy

The business model concept is normally associated with for-profit companies (Herbes et al., 2017). The concept of business model delineates the elements of value creation, value delivery, and value capture mechanisms in businesses (Schaltegger et al., 2016). Hiteva and Sovacool (2017) highlighted business models of renewable energy cooperatives driven by social and environmental motives provide a new revenue stream and value creation opportunities. Schaltegger et al. (2016) stated business leaders use sustainability-oriented business models focused on social and ecological values by exploring new supply chains and financial models outside the organizational boundaries. According to Herbes et al. (2017), the concept of business model innovation in community energy is nascent. In the last 5 years, researchers working on community energy scholarship have drawn attention to business model innovation in the community energy sector. With a focus on energy cooperatives in Germany, Herbes et al. (2017) used the cooperative model concept to identify barriers in developing new business models. Saintier (2017) studied characteristics of CECs in the United Kingdom using a

social entrepreneurship lens and conceptualized them as a social enterprise driven by hybrid business models. Hiteva and Sovacool (2017) used the concept of energy justice from a business model perspective to improve the financial viability of community energy organizations. Gasbarro, et al., (2018) applied the SE concept to study the business model of small companies engaged in the clean energy business. I observe that the previous research scholarship on business model innovations related to the community energy is generic without any focus on country-specific policy support and social-technical configuration. Therefore, with a focus on the United Kingdom's (a) market-driven policy support (Hall et al., 2016) and (b) specific social-technical energy configuration (Creamer et al., 2018), I have explored the strategies the business leaders of CECs in the United Kingdom employ to create values through business model innovations.

Turning innovations into a marketable product require multiple actors networked together known as a business ecosystem; entrepreneurs create innovative business models partnering with the multiple actors having a common business interest such as technology providers, research institutions, and the government bodies (Planko, Cramer, Hekkert, & Chappin, 2017). The technical complexity of renewable energy systems coupled with the lack of favorable policy support, necessitate community energy business leaders to develop a network of actors having a common business interest. The innovation process in the renewable energy sector is complex and rely on the actors of business ecosystems, which include consumers, suppliers, business intermediaries, and government bodies (Surie, 2017). In the quadruple helix of the innovation process, based on interactions

between civic groups, industries, research institutions, and government bodies, entrepreneurs co-create shared values using common resource and knowledge (Del Giudice, Carayannis, & Maggioni, 2017). Business leaders of community energy can take the lead to identify new opportunities by integrating technology provides, research institutions, and local authorities to develop viable business models in their business areas.

Community energy value proposition depends on the choice of the business model, organizational capabilities, consumer expectations, and policy support. Business leaders of CECs use innovative business models to create economic, social, and environmental values such as job creation, energy security, and emission reduction (Foxon et al., 2015). Business leaders of community energy guided by a community of interest extend their business beyond the local boundary to create value for the broader community and use external supply chains to innovate their business models (Saintier, 2017). Süsser et al. (2017) suggested community energy business leaders, based on the multi-nested organizational structure, extend their value proposition to cover wider geographic locations and use hybrid business models to upscale their social ventures. Collectively, based on a review of academic research and evidence available in the U.K. context, I conclude that the community energy sector in the United Kingdom is nascent and faces several challenges related to market asymmetry, policy support, and project funding. However, in spite of issues and problems, the business leaders of CECs are willing to explore innovative business models to create values in their business. Overall, the seminal research findings and evidence on the community energy sector in the United

Kingdom strongly suggest community energy business leaders use innovative business models to create social and ecological values; the business models are driven by new institutional norms, shared ownership structure, and external supply chains. Schaltegger et al. (2016) suggested SE is a mission-driven process where business leaders explore and exploit market opportunities using innovative business models to create environmental and social values. Conversely, the leaders of citizen-led organizations, the fourth helix of QH model, facilitate innovative business models using shared infrastructure and knowledge; such leaders focus on value creation for communities of common interest (Parveen, Senin, & Umar, 2015). The conceptual framework based on theoretical triangulation of two distinct concepts (a) the SE and (b) QH model found to be appropriate for this study. The theoretical triangulation can provide an in-depth and clear insight into the phenomenon by relating the findings from two theoretical lenses (Van Drie & Dekker, 2013).

Transition

In Section 1 of this doctoral study, I included the background of the problem, problem statement, purpose statement, and nature of the study with a rationale for selecting the qualitative multiple case study design. I also discussed the research question, interview questions, conceptual framework, and the significance of the study. I used theoretical triangulation strategy, two distinct theoretical perspectives (a) the SE and (b) QH model, to support the conceptual framework of the study. I conducted an in-depth review of professional and academic literature with a focus on business model innovation strategies of community energy leaders in the United Kingdom. Findings from a thorough

review of previous and current literature suggested that the community sector in the United Kingdom is in a novice state and faces several challenges, including lack of proper policy support and nonavailability of secured project funding. Nevertheless, researchers in the current literature showed a positive outlook of the community energy sector in the United Kingdom and suggested that business leaders are willing to innovate new business models through partnerships and new ventures.

In Section 2, I have included the role of the researcher, the participants, and a detailed analysis of selected research methodology and design. I also discussed (a) population selection, (b) sampling strategy, (c) aspects of ethical issues and compliance to Institutional Review Board (IRB) guidelines, (d) data collection instruments and technique, (e) data organization technique, (f) data analysis, and (g) reliability and validity. In Section 3, I have included a presentation of the data analysis to find an alignment with the research question, conceptual framework, and body of knowledge on the research topic. In Section 3, I also included findings, application to business practice, recommendations for further research, and reflections.

Section 2: The Project

The focus of this study was exploring the strategies that business leaders of CECs in the United Kingdom employ to create value through business model innovation. The specific social-technical energy configuration coupled with market-driven policies in the United Kingdom pose a unique challenge to the community energy sector, yet business leaders are willing to innovate new business models by partnering with actors of the business ecosystem (Creamer et al., 2018). In this section, I discuss the (a) purpose statement, (b) my role as the researcher, (c) participants, (d) research method and design, (e) population selection and sampling strategy, (f) ethical issues and compliance with IRB guidelines, (g) data collection and data organization technique, (h) data analysis, and (i) reliability and validity.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies that leaders in CECs employ to create value through business models driven by innovation ecosystems and new ventures. The targeted population consisted of leaders from six CECs in the United Kingdom who had successfully created value through business models based on collaborative innovation processes and new ventures. The study's implications for positive social change include the potential for communities to build innovative business models through an entrepreneurship mindset by providing energy security and employment to local communities. The research findings may also provide guidelines for leaders in community energy to build and scale up renewable energy systems in countries facing energy deficiencies.

Role of the Researcher

My background in project management related to the oil and gas sector motivated me to learn about a new form of energy generation led by civil societies. The connection between energy and community inspired me to explore the strategies that business leaders in community energy employ to achieve their business objectives. Market-driven policy support in the United Kingdom requires business leaders of community energy to innovate business models through collaborations and networks. With a focus on the business problem of community energy in the United Kingdom, as a qualitative researcher, I gathered, organized, and interpreted data and presented findings. According to Warwick-Booth (2014), researchers' involvement in data collection, interpretation, and presentation enables them to take full control over the research process. My role in this multi-case study involved preparing interview questions, selecting cases, conducting interviews, facilitating member checking, and making observations. I also complied with the Belmont Report by protecting, storing, and destroying all confidential information related to participants.

Qualitative researchers are considered instruments for data collection; however, they should be aware of any self-induced biases during data collection (Yilmaz, 2013). According to Collins and Cooper (2014), qualitative researchers should have competencies of self-awareness and self-regulation; self-awareness involves the degree to which researchers influence participants, while self-regulation indicates a researcher's ability to listen to participants carefully without being irrational. During in-depth interviews, participants may have different perspectives on research topic; however, by

using an interview protocol, a researcher may concentrate on the research question (Hurst et al., 2015). To reduce any source of bias, I designed and implemented data collection tools and procedures, including the interview questions (Appendix A) and interview protocol (Appendix B).

As a researcher, I followed the protocol of the Belmont Report to comply with ethical guidelines for the research process and obtained written consent from participants to take part in the data collection process to ensure the protection of participants' interests. Researchers use the Belmont protocol, based on three principles ([a] respect for persons, [b] beneficence, and [c] justice), to address ethical issues during research design (Adams & Miles, 2013).

It is essential for qualitative researchers to collect contextual facts during interviews (Collins & Cooper, 2014). I followed the interview protocol (Appendix B) to obtain rich and relevant data during interviews. An interview protocol is a procedural guide to direct interviewers during the data collection process (Jacob & Furgerson, 2012). I followed the member-checking method to improve the credibility and trustworthiness of the research. In the member-checking method, according to Yilmaz (2013), participants are allowed to check and evaluate whether emerging descriptions and themes reflect their perspective. I sent a summary of my interpretations to all participants for their review to ensure that emerging themes and ideas reflected their perspective.

Participants

To qualify as participants in this study, business leaders needed to have successfully implemented innovative business models in the last 5 years in any one of the

following areas: (a) demand-side energy services, (b) shared ownership models with private developers, or (c) new ventures with business ecosystem partners. With a focus on CECs in the United Kingdom, I used the purposive sampling method to select participants who had successfully implemented strategies for innovative business models. Purposive sampling is about selecting information-rich cases in a research study; qualitative researchers can gain insight and in-depth understanding of a phenomenon through information-rich cases (Suri, 2011).

I searched for representing bodies of CECs in the United Kingdom, such as Community Energy, England, to identify potential participants. Saintier (2017) selected participants for his research from sources such as intermediary organizations, network partners, and university seminars. An introductory letter describing the scope of the study and a request for formal participation were sent to identified potential participants.

Marshall and Rossman (2016) suggested that the working relationship between researcher and participants is vital in qualitative research. I established a working relationship with participants by sharing the scope of the study, using an interview protocol, and providing the consent form well in advance to make participants aware of the topic of interest. According to Yilmaz (2013), the concept of constructivism in qualitative research inextricability connects researcher and participants; therefore, the researcher should develop a close and empathic relationship with participants. Jacob and Furgerson (2012) stated that participants share more experience when the researcher's connection with participants is cordial. To ensure participants' alignment with the research question, I carefully developed interview questions with a focus on the business

problem (see Appendix A). A researcher has meaningful interactions with participants when interview questions are guided by an overarching research question (Jacob & Furgerson, 2012).

Research Method and Design

The epistemological position of the researcher guides the choice of research method (Saunders et al., 2015). Epistemologically, objectivists consider reality to be independent of social actors and possible to generalize; therefore, they use the quantitative research method (Yilmaz, 2013). Conversely, the subjectivist researcher believes that reality is contextual and constructed through social interaction, and therefore uses qualitative research methods (Saunders et al., 2015; Yilmaz, 2013). The researcher's choice of research method depends on the research question (Tumele, 2015). The purpose of this study was to explore the strategies that leaders in community energy use to create value through innovative business models. Therefore, I used a qualitative multi-case research method. The researcher using a multi-case study design can conduct an in-depth inquiry; the researcher uses the multi-case study to improve understanding of the phenomenon through replication (Ridder, 2017).

Research Method

A researcher, depending on the nature of the research study, can select any one of the following research methods: (a) qualitative, (b) quantitative, and (c) mixed. To explore the successful strategies of business leaders of CECs in the United Kingdom, I selected the qualitative research method. In qualitative research, the researcher assumes that knowledge is socially constructed and contextual, understanding that there may be

multiple interpretations of any event (Yilmaz, 2013). Guided by an interpretivist position, qualitative researchers aim to investigate individuals' understanding and interpretation of context-specific phenomena (Gog, 2015; Saunders et al., 2015). Management scholars have extensively applied qualitative research methods in studies that involve organizations and their members in a social setting (Gehman et al., 2018). Qualitative researchers value the social, cultural, and individual context in their studies; therefore, to gain in-depth understanding of real-life experiences, they engage participants through the interview process (Korstjens & Moser, 2017). To obtain an in-depth understanding of the problem faced by business leaders in community energy in the United Kingdom, qualitative research was most appropriate.

Quantitative researchers using deductive reasoning aim to test a predefined hypothesis (Saunders et al., 2015). With a purpose to obtain broad and generalizable findings, quantitative researchers remain detached from the research process; therefore, they do not capture participants' experiences in their own words (Yilmaz, 2013). Mixed methods are complex and time intensive due to the analysis of both textual and numeric data. Researchers using a mixed method require a thorough understanding of both quantitative and qualitative forms of research (Creswell, 2009). Researchers selecting mixed methods should carefully evaluate the value they may gain by using a mixed methodology against the additional resources, time, and level of expertise required to conduct such a study (McKim, 2017). Because my goal was to explore strategies, I did not plan to collect survey data or test hypotheses; thus, neither quantitative analysis nor the quantitative portion of a mixed method was suitable for my study.

Research Design

In qualitative research, researchers select a research design based on the availability of resources, time, and access to study settings and participants (Korstjens & Moser, 2017). I analyzed four possible qualitative research designs—(a) ethnography, (b) phenomenology, (c) narrative, and (d) case study—to apply in this qualitative study to explore strategies for innovative business models. Researchers use ethnographic design to study relationships within cultural groups; the findings of ethnographic-design-based research studies are often presented as lengthy monographs (Korstjens & Moser, 2017). From an emic perspective, to gain an in-depth understanding, the researcher should be familiar with the cultural setting in ethnographic design (Abdulrehman, 2017). Ethnographic design is related to the study of culture within a society or groups; therefore, it was not suitable for my research. In a phenomenological design, the researcher focuses on the lived experience of human beings; usually, this type of design is suitable to relating the lived experience of individuals (Padilla-Diaz, 2015). The phenomenological design is most appropriate for researchers who want to understand experiential knowledge of the lived experience of humans (Korstjens & Moser, 2017). Phenomenological design was not suitable for the study because my aim was not to study any events or lived experiences of participants. The aim of narrative design is to reconstruct individuals' experiences into narratives (Franklin, 2012). In narrative research, the researcher focuses on the story as an object of inquiry (Korstjens & Moser, 2017). I did not intend to study experience of individual persons; therefore, narrative design was not appropriate for my research.

I used a multiple qualitative case study design for this research study because I aimed to understand the strategies that business leaders in community energy use to create innovative business models through an in-depth inquiry. Researchers use an exploratory approach when they are unsure of an issue or problem; a researcher using a case study design can achieve an in-depth inquiry (Saunders et al., 2015). Researchers use the case study design to understand the interaction of phenomena and their context (Eisenhardt & Graebner, 2007). I selected a multiple case study approach to achieve replicability (Saunders et al., 2015). Yin (2018) suggested that researchers' findings from multiple case studies are considered replicable and more robust compared to a single-case study. Eisenhardt and Graebner (2007) suggested that findings from multiple cases are typically more robust, generalizable, and testable. Therefore, I used a multiple case study approach to explore the strategies that leaders in community energy use to create value through business models driven by innovation ecosystems and new ventures.

Data saturation is an integral part of rigor in qualitative research (Morse, 2015). Failure to achieve data saturation can adversely impact the validity of research (Fusch & Ness, 2015). Morse (2015) defined data saturation as a process of building rich data through replication. Fusch and Ness (2015) stated that rich data reflect quality while thick data reflect volume; they also suggested that data saturation is achieved when no new information or themes emerge in data analysis. In this study, I achieved data saturation using two strategies: (a) a multiple case study design to replicate findings, and (b) a well-structured and common interview questions to the participants. A researcher using multiple case study design supports the logic of replication and provides a strong base for

theory building through better grounded, robust, and generalizable findings (Eisenhardt & Graebner, 2007; Yin, 2018). The researcher can use well-structured and focused interview questions for all participants to achieve data saturation with purposive sampling (Fusch & Ness, 2015; Suri, 2011).

Population and Sampling

Defining the Population

I selected the population for this multiple case study from business leaders of CECs located in South West part of the United Kingdom. The selection criteria for the population included (a) expert knowledge in value creation through innovative business models and (b) a successful business operation for over 5 years. Community Energy England (2018) reported that there are 94 CECs located in South England, compared to 33 and 35 in Midlands and North England, respectively; such regional clustering reflects local knowledge, resources, and expertise to support a community project. In a qualitative empirical study, Saintier (2017) selected participating organizations from the South West part of England because they were successful and their leaders had a positive outlook on the sector. I aimed to choose a homogeneous population through purposive sampling. In purposive sampling, a researcher deliberately selects participants who are knowledgeable and proficient with the phenomenon of interest (Etikan, Musa, & Alkassim, 2016). According to Suri (2011), a relatively small and homogeneous population selected through purposeful sampling can provide an in-depth understanding of a phenomenon. Jacob and Furgerson (2012) suggested that a researcher should conduct interviews in a private office without much distraction or background noise. I conducted the interviews

at the participant's organization in a private office or in an isolated place to maintain confidentiality and minimize any distractions.

Sampling

Using homogeneous purposive sampling, I selected nine participants from CECs for the semistructured interviews. A homogenous population of four to 12 participants can be sufficient in a qualitative method (Saunders et al., 2015). Data saturation can have an impact on the validity of a qualitative method; data saturation is achieved by a researcher when it is not possible to observe any new information or themes in data analysis (Fusch & Ness, 2015). Boddy (2016) suggested that in a qualitative research method, sample size is considered sufficient if it can lead to data saturation. According to Fusch and Ness (2015), a researcher can reach data saturation by having well focused and structured interview questions. For data saturation with a relatively small group of participants, the researcher should ensure that the sample size is adequate to support replication; additionally, participants should have appropriate knowledge of the phenomenon of interest (Morse, 2015). I ensured that the selected participants were experts in the phenomenon of interest; further, through well focused and structured interview questions, I continued to interview individual participants until no new information emerged.

Ethical Research

Ethical issues are associated with qualitative research design (Roulston & Preissle, 2018). The researcher should safeguard the interest of individuals taking part in interviews due to the involvement of human subjects in a qualitative study (Grossoehme,

2014). A researcher must comply with IRB regulatory criteria before a qualitative study involving human subjects can begin; IRB committees are mandated to enact ethical standards for human subjects (Blackwood et al., 2015). I gained permission from Walden University's IRB before commencing the interviews. The purpose of the informed consent process is to communicate study risks and benefits to potential participants to support their decision concerning participation (Nusbaum, Douglas, Damus, Paasche-Orlow, & Estrella-Luna, 2017). The researcher should submit informed consent to the university IRB and convince IRB decision makers that the benefits of the study outweigh any potential risks to participants, as well as explain steps taken to safeguard participants' interests (Babb, Birk, & Carfagna, 2017). In soliciting potential interview participants, I sent a letter explaining the intent of the study via email. In the participant consent form, I described the research background, interview process, and steps to protect participants' privacy. Additionally, I indicated that participation was voluntary, noting that participants could withdraw at any point in time without penalty. I also indicated that there was no payment or compensation for participating in the interviews.

Protecting human subject participants, as outlined by the Belmont Report, is a continuous effort that a researcher must engage in during the research process (Fiske & Hauser, 2014). A researcher's ethical reflexivity and conduct at every phase of the qualitative research process are crucial for the protection of participants' interests (Roth & von Unger, 2018). Through the practice of ethical reflexivity, I ensured that participants' interests were protected. In addition to protecting the privacy of participants in the research findings, I preserved privacy in the actual data collected from participants

during interviews. According to Grossoehme (2014), researchers should protect the identity of participants, including names and organizations, in published research reports. I assigned alphanumeric codes to all participants and their organizations to protect their identity in my published research document (e.g., P1, P2, etc.). As part of a data protection strategy to safeguard the confidentiality of participants, I stored collected data in the form of transcript and audio recordings in a locked filing cabinet that will be accessible only by me for the next 5 years. After 5 years of safe storage, I will destroy all electronic data and hard copies for the study. I have included the Walden IRB approval number 08-20-19-0701440 in the final doctoral manuscript.

Data Collection Instruments

Researchers are considered the primary data collection instruments in qualitative research; they can increase the credibility of findings by using a combination of interviews and document analysis (Yilmaz, 2013). I conducted interviews with participants who were the primary source of data collection. In a case study, the researcher should use multiple sources of data; researchers use documentary evidence to corroborate the interview findings (Yin, 2018). I used documentary evidence to substantiate the interviews; such documentary evidence included business reports and vision statements retrieved from the websites of individual community energy organizations. In a case study design, the researcher can use interview data in combination with other qualitative data such as documentary evidence to create a detailed case description (Ridder, 2017).

The qualitative researchers can use a well-scripted interview protocol to keep the

focus on interview questions and take appropriate action during the interview process (Jacob & Furgerson, 2012). I used an interview protocol (see Appendix B) and set of open-ended interview questions aligned with the research question (see Appendix A) for the semistructured interviews.

After the interviews, I used member checking to get the participant's feedback on my interpretation of their response to interview questions. Qualitative researchers commonly use member checking to validate the interview interpretations (Smith & McGannon, 2018). The process of member checking, in which a participant checks and evaluates the interpretations to see if it reflects their viewpoints, enhances the validity of findings (Grossoehme, 2014; Yilmaz, 2013).

In addition to the member checking, I used theoretical triangulation to improve the validity of findings through the corroboration of evidence from different perspectives. In this study, the conceptual framework was based on two distinct but complementary concepts (a) SE and (b) the QH innovation model. I used theoretical triangulation to develop a more in-depth and comprehensive insight into the phenomenon of interest by relating two perspectives of entrepreneurship and innovation. Van Drie and Dekker (2013) used theoretical triangulation and showed an in-depth and clear insight into the phenomenon by connecting the findings from the different theoretical lenses. I further elaborated on theoretical triangulation in the data analysis section.

Data Collection Technique

The validity of qualitative research depends on the interviewer's ability to collect meaningful data on the topic of interest within the allotted interview time (Hurst et al.,

2015). I explored the strategies of community energy business leaders using a multiple case design; I used semistructured interviews with participants followed by member checking. Researchers collecting data through interviews capture emotions, nonverbal communications, and provide contextual facts (Collins & Cooper, 2014). Another advantage of using interviews as a data collection technique is the researcher can elucidate real-life problems through the personal experience of participants (Yilmaz, 2013).

Smith and McGannon (2018) noted that researchers using semistructured interviews based on predetermined interview questions could overlook insightful knowledge and produce superficial findings. Another problem during an interview process is the cultural difference that interviewers usually face in an international setting; in a cross-cultural interview, the interviewer may fail to interpret actual meaning in an interviewee's response (Saunders et al., 2015). During the interview process, participants could face emotional issues, distress, or disconnect; therefore, the researcher should look for different ways to address such matters (Hurst et al., 2015). Emotional maturity and interpersonal skills can strengthen a researcher's ability to listen and react during interviews (Collins & Cooper, 2014). The researcher should arrange a quiet and semi-private location for the interview (Jacob & Furgerson, 2012). I ensured the interview location was free from background noise and comfortable for participants to take part in the interview.

Researchers use an interview protocol to elicit useful data and keep the focus on the interview process (Jacob & Furgerson, 2012). The interviewer continues to focus on

the research topic when guided by an interview protocol (Grossoehme, 2014). I conducted open-ended, face-to-face, semistructured interviews with nine community energy organization business leaders. I used an audio recording device to record the interviews with the participant's permission. Additionally, I made detailed notes of the answers provided by all the participants. Saunders et al. (2015) stated taking notes along with audio recording is beneficial as it allows the researcher to record any thoughts or events that would not be evident from the audio recording. Jacob and Furgerson (2012) recommended that the interviewer be a good listener as this allows participants to feel heard and open-up. I concentrated on listening and taking notes of participants' responses. The interview protocol describing procedural aspects interviews and semistructured interview questions are in Appendix A and B of this study. I used member checking to improve the validity of research findings. Researchers send the final interview interpretations to participants for validation; if participants confirm the correctness of the interpretation, the results are considered credible (Smith & McGannon, 2018). Through the member checking process, I received the participants' feedback about the interview interpretations.

Data Organization Techniques

Qualitative researchers with meticulous record keeping and demonstration of decision trails can make data organization auditable, hence, improve the credibility of research (Noble & Smith, 2015). Researchers by developing a case study database and the orderly compilation of data and documents collected from the field, improve the reliability of research findings; the database presents a chain of evidence which can be

reviewed by an external observer or by the researcher at a later stage for further analysis (Yin, 2018). Researchers using NVivo software can enhance the rigor of the research by providing an audit trail of decisions made during data collection and analysis (Houghton, Murphy, Shaw, & Casey, 2015) As part of data organization strategy, I used NVivo 12 software to orderly organize (a) field notes, (b) documents, (c) narratives, and (d) the entire set of answers collected during a field visit. A case study researcher must follow a procedure to ensure the data collection process is transparent and auditable (Yin, 2018). I arranged collected data in both electronic format and hard copies in an organized manner to ensure easy retrieval. I will protect electronic data stored in a USB with a PIN code; I will store hardcopies with electronic data in a fire safe locker. I will destroy all electronic data and hard data copies used in the research after 5 years.

Data Analysis

Qualitative researchers are guided by the nature of the research question and the conceptual basis during the interpretation of data (Saunders et al., 2015). Qualitative data analysis is crucial to research quality, but it is labor intensive, complex, and time-consuming activity (Ngulube, 2015). Qualitative data can have multiple meanings; therefore, the researcher should carefully explore and clarify their interpretations of data (Saunders et al., 2015). The qualitative researchers can ensure the rigor of research findings by providing a thorough report on the data analysis stages (Houghton et al., 2015). The process of data analysis is not predetermined; qualitative researchers analyze the data as collected. Also, researchers using an interactive process of data collection and analysis can recognize important themes at the early stage of study (Korstjens & Moser,

2018; Ngulube, 2015). I used a multi-step data analysis strategy in the research. Yin (2018) recommended five data analysis steps (a) compile data, (b) disassemble data, (c) reassemble data, (d) interpret the meanings, and (e) conclude the data analysis. Houghton et al. (2015) used a multi-stage data analysis strategy comprising (a) comprehending data with broad coding, (b) synthesis with pattern coding and reassemble, (c) theorizing, and (d) recontextualizing data in multiple case study research.

Qualitative researchers using theoretical triangulation analyze the same data set from a different or alternative theoretical perspective; data analysis with multiple theoretical lenses are considered more reliable (Fusch, Fusch, & Ness, 2018). Theoretical triangulation is a pragmatic approach in data analysis guided by distinct yet complementary theories to generate deep understandings and explanations (Pitre & Kushner, 2015). I used the theoretical triangulation strategy and the conceptual framework based on (a) the SE and (b) QH model of innovation for data analysis.

The researcher should manually attempt to identify codes before employing any data analysis software; computer-aided tools alone without researcher involvement will not produce presentable output (Yin, 2018). Researchers use computer-assisted qualitative data analysis software (CAQDAS) to manage and manipulate data effectively and quickly; however, the software does not replace the analytical skills of researchers (Houghton et al., 2015). I used NVivo10 software during my Master's degree dissertation research project, and due to my familiarity and experience with NVivo software, I used NVivo version 12 for data analysis in this study. I began by manually reading and color

coding the common and repetitive information from the interview transcripts and notes to identify predetermined codes to guide the direction of analysis.

The qualitative researcher in a case study uses pattern matching logic to compare empirical patterns with predicted patterns based on a theoretical perspective that strengthens internal validity (Yin, 2018). Pattern matching is a means to compare the theoretically predicted key themes with the empirical data; such comparison allows the researcher to correlate new elements with the theoretical perspectives (Ridder, 2017). The pattern matching between the data and theory indicates theoretical arguments are empirically supported (Eisenhardt & Graebner, 2007). I used a pattern matching strategy to find an alignment between the empirical pattern and the predicted pattern based on the conceptual framework; also, I compared empirically emerged themes with new research studies published after the research proposal was approved.

Reliability and Validity

Qualitative research is a naturalistic inquiry guided by the researcher's subjectivity; therefore, the researcher should value rigor while dealing with narratives and perceptions of participants (Cypress, 2017). Qualitative scholars have proposed an alternative to reliability and validity in quantitative research, such as trustworthiness due to contextual settings in a constructivist paradigm (Houghton, Casey, Shaw, & Murphy, 2013). Qualitative scholars Lincoln and Guba in 1985, proposed criteria for trustworthiness, namely, transferability, dependability, confirmability, and credibility (Cypress, 2017). Yin (2018) supported trustworthiness as a criterion to judge the quality of the research design. According to Morse (2015), the four elements of trustworthiness,

(a) credibility, (b) dependability, (c) transferability, and (d) confirmability are respectively analogous to quantitative criteria of (a) internal validity, (b) reliability, (c) external validity, and (d) objectivity.

Reliability

The notion of reliability based on the positivist approach deals with repeatability, replicability, or stability of results; however, in qualitative research, the context-specific settings and human behavior keep changing with time (Cypress, 2017). Therefore, scholars have proposed the alternate term dependability as comparable to reliability (Houghton et al., 2013). Dependability in a qualitative study is equivalent to the reliability, defined as the ability to produce the same results if the study is to be repeated (Morse, 2015). A study has dependability if the process of selecting, justifying, and applying research strategies, procedures, and methods are clearly explained and evaluated by the researcher (Yilmaz, 2013). According to Yin (2018), researchers producing auditable documents and a case study database can enhance the reliability (dependability) of case study research. Researchers using audit trails in the form of notes or as part of NVivo documentation outlining the rationale regarding methodological choices and contextual background of data improve the dependability of study (Houghton et al., 2013). I maintained an audit trail of the case study database and documentation, outlined the processes of data collection, analysis, and interpretations, and made it available for external reviewers. According to Yilmaz (2013), the researcher can demonstrate dependability of a study by ensuring the choice of research design is congruent with the research question. I used a multiple case study design to explore strategies the leaders of

CECs employ to create innovative business models; therefore, the research design is in congruence with the research question. The congruence between the research question and research design enhanced the dependability of the study.

Validity

The concept of validity, rooted in the positivist tradition, is related to the accuracy and truthfulness of research findings in the quantitative study (Cypress, 2017).

Qualitative scholars have argued validity is not applicable in qualitative research and suggested the term credibility as analogous to validity. Houghton et al. (2013) suggested credibility deals with the value and believability of the findings; the researcher can achieve credibility by (a) researching believably and (b) demonstrating results are coherent and related to theoretical perspective. The credibility of a qualitative study can be achieved by (a) data collection from multiple sources, (b) thick and rich description of interpretation, and (c) member checking (Yilmaz, 2013). Yin (2018) recommended multiple sources of evidence to support convergence and coherence in findings, and, also stated readers consider the result convincing and accurate when data is collected from multiple sources. I used data from two different sources (a) semistructured interviews and (b) documentary evidence such as business reports and vision statements. A qualitative researcher can control subjective bias using member checking; when a participant reviews the interview interpretations, the findings are considered credible (Smith & McGannon, 2018). I also used the member checking strategy to improve the credibility of research findings. In theoretical triangulation, a researcher uses multiple perspectives to analyze data to create a coherent and comprehensive understanding of the phenomenon.

Research findings based on theoretical triangulation are considered robust, complete, and well-developed (Van Drie & Dekker, 2013). I aimed to convince readers by developing a robust and comprehensive knowledge based on theoretical triangulation of two distinct concepts (a) the SE and (b) QH model of innovation.

Transferability in qualitative research is comparable to external validity or generalizability when researchers transfer the original findings to another context (Morse, 2015). A researcher achieves transferability when the findings of a qualitative study are transferable to a different but similar setting; researchers by providing a detailed account of the background, context, and events under investigation can enhance the transferability (Yilmaz, 2013). Researchers should give a thick and rich description of findings with a contextual setting to enable the reader's judgment about the transferability to another context (Houghton et al., 2013). Transferability can be achieved using purposive sampling (Cypress, 2017). I used purposive sampling to select information-rich cases, also, provided a thick description of setting and context to readers so that they can decide about the transferability of the research findings to any specific context.

Confirmability in a qualitative study is related to neutrality; researchers by providing an audit trail can help readers to make a judgment about potential biases or prejudice in the research (Houghton et al., 2013). A researcher with an audit trail of data collection, analysis, and interpretation processes can enhance the confirmability of research (Cypress, 2017). A researcher can achieve confirmability through an auditable process of data collection and analysis (Yilmaz, 2013). Similar to dependability, I achieved confirmability by maintaining an audit trail of the case study database and

documentation, outlining the processes of data collection, analysis, and interpretations. I made an audit trail available for external reviewers.

A researcher achieves data saturation when they do not observe any new information or themes in data analysis (Fusch & Ness, 2015). Multiple sources in data collection can add depth and richness to data, thus support data saturation (Fusch et al., 2018). According to Morse (2015), data saturation is a process of building rich data with a focus on replication. I achieved data saturation using the following strategies (a) well-structured and consistent interview questions for all the participants, (b) multiple case study design to replicate findings across cases, and (c) multiple sources of data such as interviews and documentary evidence.

Transition and Summary

In Section 2, I recapitulated the purpose of the study, the role of the researcher, the participants, research methodology, and research design. With a focus on business model innovation strategies of community energy business leaders in the United Kingdom, I discussed participant selection and sampling criteria, strategies to address ethical issues in the research, and data collection process. I concluded Section 2 with a discussion of data organization techniques, data analysis methods, and techniques to improve reliability and validity. At the beginning of Section 3, I briefly described the purpose statement and the central research question of this research. Additionally, I included the presentation of findings, application of professional practice, and implications of social change. I concluded Section 3 with recommendations for action and future research, my reflection, and conclusion.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative multiple case study was to explore the strategies that leaders in community energy employ to create value through business models driven by innovation ecosystems and new ventures. The targeted population encompassed business leaders in the United Kingdom who had successfully created value through business models based on collaborative innovation processes and new ventures. I interviewed nine participants from six CECs located in the southern and western parts of the United Kingdom. I selected participants based on their responses to invitation letters and their consent to take part in the interview process. I also collected data from secondary sources, which included field visit notes, mission statements, and organizational annual reports.

The organizations of selected participants had varied ownership structures and business offerings, as well as diverse roles; however, all organizations were focused on creating and maximizing values for the local community where they operated. Table 1 shows the organizations' codes, structures, business offerings, founding years, participant codes, and job profiles. Based on data analysis, I identified five themes: (a) purpose-driven entity with actions to multiply impact, (b) collaboration and partnerships, (c) opportunity identification and realization, (d) growth focused and commercial venturing, and (e) innovation and shared knowledge.

Table 1

Organization and Participant Profiles

Organization code	Type	Business offerings	Year founded	Participant code	Participant profile
O1	CBS, CIC	Energy generation, Community investments, Business support services	2011	P1	Social impact director
O2	CBS	Energy generation Advisory services	2014	P2, P3	Secretary & cofounder Project director
O3	CBS	Energy generation	2012	P4	Chairman
O4	CIC	Community investments, Anchor assets Business support services	2014	P5, P6	Managing director Project director
O5	Social enterprise	Energy generation, Community investments, Business support service	2014	P7, P8	Business development Manager Projects manager
O6	CBS	Energy generation	2014	P9	Chairman

Presentation of the Findings

The central research question that guided this study was the following: What strategies do leaders of CECs use to create value through business models driven by innovation ecosystems and new ventures? The themes that emerged from the data analysis were (a) purpose-driven entity with actions to multiply impact, (b) collaboration and partnership, (c) opportunity identification and realization, (d) growth focused and commercial venturing, and (e) innovation and shared knowledge. The five themes that emerged from my data analysis were significant because they addressed the research question and the findings aligned with my study's conceptual framework, which was

based on the theoretical triangulation of the SE and QH models. I also observed that emerging themes substantiated past professional and academic literature reviews and corroborated current scholarly findings. Table 2 shows theme numbers, theme descriptions, ties to the conceptual framework, ties to past and current literature, and participant response references.

Table 2

Emerging Themes

Themes	Theme description	Ties to conceptual framework	Ties to literature	Participant responses
Theme 1	Purpose-driven entity with actions to multiply impact	SE concept	Yes	Appendices C & D
Theme 2	Collaboration & partnership	SE concept & QH model	Yes	Appendices E, F, & G
Theme 3	Opportunity identification and realization	SE concept	Yes	Appendices H & I
Theme 4	Growth focused and commercial venturing	SE concept	Yes	Appendix J
Theme 5	Innovation and shared knowledge	SE concept & QH model	Yes	Appendix K

Theme 1: Purpose-Driven Entity With Actions to Multiply Impact

All the participants expressed that the mission of their organization was to create social, environmental, and economic values for local communities where they operated.

P1 mentioned,

We are social enterprises that aim to meet our energy needs in a way that's good for people and good for the planet, we don't think these are mutually exclusive. We use

a “4 P” framework for social impact assessment, we have measures that include (a) carbon saving, (b) prosperity in terms of saving, (c) the number of people involved and membership grown, and (d) stakeholder perception (what they think about us). Every year we create an annual summary of our performance against key indicators.

P2 stated, “We create triple-bottom-line values of social, economic and environment. We are driven by environmental value to decarbonize the energy systems. Social and economic value is equally important for us, but the social value is less tangible.” P3 explained,

Solar panel hosting organizations benefit from being part of our green supply chains, some clients want to do business with organizations having green credentials. We help in terms of reducing carbon emissions. We work in schools and influence them to adapt to renewable energy.

P4 stated, “We aim to create value for our community shareholders, also we aim to meet the social needs of the community as well.” P6 noted,

All projects run for community purpose, they are different from regular companies which run for the benefit for shareholders; all the project we work have a mission focused on community purpose at their heart. We create three values, social, economic, and environment.

P8 said,

We aim to create social, economic, and environmental values through community energy projects. Wales government has recognized the value of local ownership of

energy and also recognized the importance of creating social, environmental, and economic values by engaging local communities.

The leaders of the CECs focused on purpose-driven strategies to create triple-bottom-line values. Appendices C and D depict inductively developed Theme 1 and participant responses.

In addition to their motives, several participants shared their views on actions that they used to multiply the impact of community benefits. Guided by CBS and CIC principles, all community energy groups reinvest a certain amount of their profits into local communities. It was observed that most community energy groups set up community energy funds to promote energy efficiency, overcome fuel poverty, and promote the adoption of low-carbon technologies in local communities where they operate. P1 stated,

The multiplier effect we create by reinvesting into local communities.... People think being a social enterprise, we are not interested in profit, but in fact, we are interested in squeezing every single penny we can to increase our profit, which we can then be used with a purpose.

P3 noted, “There are community energy funds we provide grants, provide money to overcome fuel poverty, etc., also create social and environmental values for the local community.”

P5 explained,

The main benefit is to generate a surplus profit to support the social purpose of the community. There is a carbon multiplier effect, and there is also an opportunity to

recycle the fund for carbon reduction initiatives that the commercial finance market will not fund.

P7 stated,

The main reason for CBS is used to raise a significant amount of money locally. It also creates a multiplying effect; the profit in the form of annual interest goes back to the local community, and also surplus amount goes back to community funds.

P8 noted, “We have purpose-built community funds; lots of financial benefits goes back to the community instead of going to big energy companies.” P9 said, “Our surplus income goes to community fund as mandated by CBS guideline, we use this funding model to create social values, to educate energy users about fuel poverty and energy efficiency.”

Ties to conceptual framework. The process of SE includes recognizing the social or environmental problem and developing triple-bottom-line solutions (Belz & Binder, 2017). According to Vuorio et al. (2018), SE is about triple value creation. Guided by inherent contingency characteristic, sustainable entrepreneurs acclimate to new circumstances and commit themselves and their firms to reach a certain level of efficiency in social, economic, and environmental sustainability (Kraus et al., 2018). I established a strong connection between Theme 1 and the SE concept and its characteristics, which underpinned the conceptual framework. In the following paragraph, I substantiate Theme 1 with past professional and academic literature that is corroborated by the current findings.

Ties to past and current literature. Sustainable entrepreneurs act as actors that cocreate new societal regimes and coevolve with institutions and other regime actors (Gasbarro et al., 2017). Sustainable entrepreneurs take actions to construct new measures,

build consensus, and forge new relations to create new institutional norms (Sarango-Lalangui et al., 2018). Braunholtz-Speight et al. (2018) stated that community energy business leaders guided by the Community Benefit Society Act 2014 extend their offerings to a broader community and reinvest their profits into local communities to promote entrepreneurial activities. Hiteva and Sovacool (2017) discussed the CIC form of hybrid business structure in the United Kingdom where leaders, driven by social purpose, extend their business offerings to wider communities and reinvest their profits while their assets remain in a locked state.

Aligned with Theme 1, the business leaders of CECs in the United Kingdom use the following business practices: (a) functioning as a purpose-driven entity with a focus on creating social and environmental benefits, (b) engaging with local communities, (c) focusing on multiplying community benefits, and (d) extending support to the local economy. In addition to contributing to the low-carbon-energy transition, community energy groups support social innovation by pursuing goals such as community empowerment, alleviation of fuel poverty, provision of energy justice, and increasing the wellbeing of local communities (Hoppe & De Vries, 2019). Through local community engagement, business leaders of CECs can keep the cost and benefits of energy generation within the community, which in turn can support the local economy over the long term (Huh, Yoon, & Chung, 2019). Energy communities are locally focused and promote sustainable and resilient practice in society (Prehoda, Winkler, & Schelly, 2019).

Community energy groups contribute in sustainability development projects that include (a) transition town initiatives, (b) eco-villages, and (c) energy efficiency and

saving initiatives (Hewitt et al., 2019). CECs focus on local communities to promote sustainability and support pilot projects to empower local citizens to improve their living conditions (Magnusson & Palm, 2019). Based on the above analysis, I found that Theme 1 substantiate with past academic literature and corroborate by current scholarly discussions on effective business practices.

Theme 2: Collaboration and Partnership

In the absence of favorable community policy supports, subsidies, and tax benefits in the United Kingdom, most participants, to remain profitable and continue to work toward their mission, expressed that they were involved in collaboration and partnership with the ecosystem of the community energy business. The main purpose of collaboration and partnership is to create shared values and mutual benefits. The purpose also includes securing funds and integration of new business concepts into the value proposition.

Most participants highlighted the main purpose of collaboration and partnership as creating shared values for the ecosystem. P1 stated,

We largely worked on a collaborative and partnership basis. We are extremely lucky that our local city council is very cooperative and forward thinking and really proved a very collaborative partner. In these partnerships, we look for synergy to create values; we are working with some good partners who have experience in the energy system.

P2 expressed, “We collaborate with local authorities, as they are developing renewable energy strategy for the city.” P4 explained, “any business model innovation,

developed within a collaborative environment, will have shared value for the complete ecosystem.” P5 stated, “We collaborate with social enterprise banks to create shared value, they are socially driven organization, engage with the local community, and keep some cost of finance within the community.” P7 noted, “We collaborate with local government in shaping the supports and enabling community groups to grow, we are working with local authorities to create new opportunities. We are also exploring opportunities to develop community energy projects in shared ownership.” P8 stated, “We share our previous experience on a specific problem related to community energy projects to a broader group of members and support their learning by sharing our expertise.” Appendix E depicts Theme 2 (for shared value purpose) and participant responses.

Many participants highlighted that the purpose of collaboration and partnership is to secure startup funds or seed capital at lower interest rates. P1 noted,

Renewable projects require significant upfront capital, we are lucky that we have a strong partnership with the local city council. They have given us a short-term debt financing facility, which means we can withdraw funds when we have an opportunity.

P4 stated, “We work in partnerships with councils, we are working in a shared ownership model with local city council who will collect revenue on our behalf.” P5 highlighted,

We have set up a renewable energy community with support from the local city council, which had a very supportive and cooperative councilor. The council provided seed funding and resources to set up the community energy; they

outsourced a council energy advisors team into the newly founded energy community with services contracted to cover this cost.

P7 stated,

We have a strong relationship with the Wales government. They provide practical support in the form of government-driven energy support services. They also offer development loans to start projects; if the project fails to take off, then CECs don't have to repay this loan, there is no risk for them, and local government takes the risk.

P9 stated,

With the withdrawal of the FIT regime, we collaborate with local authorities to raise the profile of community groups in the London area. We also secured a grant for our latest project from the carbon offset fund of a well-reputed airline as part of their low-carbon initiative.

Appendix F depicts Theme 2 (for funding purpose) and participant responses.

All participants expressed their concern related to community energy business viability in the United Kingdom due to the withdrawal of the FIT incentive. Further, participants contended that the partnership within the business ecosystem is a necessity to move forward. Participants stated the main purpose of partnerships as including (a) new value proposition in the area of energy services, (b) low-cost lease agreements for hosting solar panels, and (c) long-term power purchase agreement (PPA) with energy suppliers. P1 explained,

We are collaborating with the National Energy Foundation and RetrofitWorks in supporting individual householders in the county interested in improving the energy efficiency of their homes. In our partnership, we help the local community in creating efficient ways of energy-saving, also provide vision and solutions to improve energy efficiency in residential buildings.

P2 stated, “We are working with the city council for school programs; we have installed solar panels at nine school sites and in the university installing panels at three sites.” P4 mentioned, “We collaborate with outside community energy groups based in other cities. Sometimes, they provide useful business contacts.” P5 highlighted,

We are keen to collaborate with local authorities in the area of long-term power purchase agreements. The agreement will serve two purposes (a) they achieve their carbon reduction goals by buying energy on a long-term basis of 15-20 years, and (b) we can get an alternate of FIT to make a viable business model.

P6 stated, “local authorities and councils are willing to provide a route to market for the power. Now FIT is withdrawn. This gives us a new opportunity to have creditworthy partners for the long-term power purchase agreement to ensure secured income.” P7 expressed, “There was a FIT subsidy, and now it is being withdrawn. We are collaborating with the Wales government to create new opportunities in the community energy sector where profit generated remains within the local communities.” P8 stated, “We work with a lot of stakeholders and organizations. We work with schools, energy clubs, also having trusted solar panel installers and solution providers.” Appendix G depicts Theme 2 (for business viability purpose) and participant responses.

Ties to conceptual framework. The collaboration and partnership strategies, with objectives (a) create shared values; (b) secure funding; and (c) add new energy services in the value chain, were found to be very prevalent among all the participants. Sustainable entrepreneurs forge new partnerships and collaborations to challenge existing institutions or regimes (Sarango-Lalangui et al., 2018). Sustainable entrepreneurs take measures and forge partnerships to build new institutions (Thompson et al., 2015). Sustainable entrepreneurs initiate collaborations for new value propositions, therefore, overcome normative and cultural-cognitive institutional barriers (Gasbarro et al., 2018). It was evident that Theme 2 is strongly linked to the SE concept and the trait of sustainable entrepreneurs, which help them forge collaborations and partnerships to overcome institutional barriers. It was also evident from Theme 2 that business leaders often forge partnerships to create shared values and mutual benefits within the community energy business ecosystem.

The purpose of creating shared values through collaborations allowed me to view Theme 2 from the lens of the QH model. In the quadruple helix of the innovation process, civic groups interact with industries, research institutions, and government bodies to co-create shared values using common resource and knowledge (Del Giudice et al., 2017). According to Rustiadi et al. (2018), business leaders utilize available social capital to drive economic activities and collaborate to create knowledge for mutual benefits. The leaders of community-led organizations bring together different actors of common interest; they act as catalysts for the shared innovation and knowledge development (MacGregor et al., 2010). Based on the above analysis, I observed that Theme 2 is

strongly linked to the SE concept and, also well supported by the QH model. Therefore, I found that Theme 2 underpins the conceptual framework from perspectives of both the SE concept and QH model. In the following section, I substantiate Theme 2 with past professional and academic literature reviews, and also, corroborate with current findings.

Ties to past and current literature. Entrepreneurs create innovative business models partnering with the actors of the business ecosystem, that includes technology providers, research institutions, and government bodies (Planko et al., 2017). Community energy organizational leaders develop business networks to extend their consumer base (Herbes et al., 2017). The value proposition and services of community energy groups rely on the actors of business ecosystems, that include consumers, suppliers, business intermediaries, and government bodies (Surie, 2017). Aligned with Theme 2, as part of business practices, the leaders of CECs in the United Kingdom use collaboration and partnership for following purposes (a) create shared values, (b) secure funds and project financing, and (c) improve business viability. As part of social innovation, community energy groups reconfigure social practice, networks, and institutions to overcome challenges and create new opportunities (Hoppe & De Vries, 2019). Collaborative partnerships between community groups, research institutions, and energy utilities can result in shared values and mutual benefits, although democratic control and decision-making remains with citizens (Prehoda et al., 2019). Business leaders of CECs have the potential to create a partnership between citizens, industry, and municipalities; they forge a network of actors to work for collective benefits and reduce barriers (Magnusson & Palm, 2019). Community energy groups collaborate with other actors in the business

ecosystem to create innovative business models for their survival in a subsidy free environment (Mirzania, Ford, Andrews, Ofori, & Maidment, 2019). Community energy groups create partnerships with local governments and other actors to support a common vision (Sait, Chigbu, Hamiduddin, & De Vries, 2019). Based on the above analysis, I found that Theme 2 was substantiated with past professional and academic literature reviews that was corroborated by the current scholarly discussions and effective business practices.

Theme 3: Opportunity Identification and Realization

Most participants expressed that in the absence of FIT support, the long-term business viability of CECs will be difficult. Therefore, they wanted to explore new business opportunities in the areas of (a) energy efficiency, (b) demand-side response, (c) peer-to-peer trading, (d) power purchase agreement, and (e) EV charging infrastructure and electric mobility. Participants were hopeful of new business opportunities because their local governments recognized climate energy and were supportive in creating new business opportunities. P1 noted,

With FIT being withdrawn, we are looking for new ways to create value. We are looking at different propositions, which include micro balancing of existing PVs by combining with batteries to shift energy with time and demand, in future, the value will come from shifting energy supply with demand time.

P2 highlighted, “Because of climate emergency declared by our local city council, there are many new opportunities expected to come; we have a good understanding of financial and business matters so we can identify new opportunities.” P4 mentioned,

We are also taking a calculated risk to remain profitable in the business, also there no risk-free business model. The city council has recognized the climate emergency and they are willing to take-action on climate change. In case we have a viable business model, they support us.

P5 stated,

We saw an opportunity to buy a solar farm developed by a commercial developer. We managed to negotiate the purchase of a solar farm from the commercial developer and convert this into a community energy group. We funded the purchase deal with a short-term loan of 11million pounds.

P6 expressed, “We are looking for any opportunity which can provide us a viable business model. Now solar farms look viable because the cost of solar-based renewable energy has fallen substantially. A large-scale solar farm can be profitable in a subsidy-free environment.” P7 mentioned, “The Wales government declared a 70% of renewable energy target by 2030, 1 gigawatt capacity from locally generated sources, and the element of local ownership from 2020 in all renewable energy projects. These policy supports will create new opportunities for CECs in Wales.” P9 stated, “In the absence of FITs (or equivalent support from the government), we will need to focus on larger solar farms to have a viable business model.”

During interviews, it was observed that within the United Kingdom, the community energy policy supports for Wales is different from that of England due to local devolved administration. P7 highlighted,

The situation in Wales is different from England. The Wales government legislation for future generation mandates all renewable energy projects on public lands needs to have an element of local community ownership. This will give a negotiation power to smaller community organizations in Wales, which is similar to what we have in Scotland. We see this as a future opportunity for growth. The proposed legislation mandating the involvement of the local community can support and balance shared ownership models.

Appendix H depicts the inductively developed Theme 3 (opportunity identification) and participant responses.

Having identified opportunities to create new values in the community energy business, most participants described their strategies to realize these opportunities. Participants stated they work with local city councils, commercial developers, local schools, and startups to capitalize on new opportunities. P1 highlighted,

We are currently running a project called “Cosy Homes” in our county, which aims to reduce overall domestic energy consumption. We help the local community by providing vision and solutions to improve energy efficiency in residential buildings.

We are also exploring the SME market in terms of energy efficiency solutions.

P2 stated, “We are working for EV charging project with the local city council to explore new business opportunities; we also want to develop and buy solar farms, in order to sustain our business, we need to add 1 megawatt per year generation capacity.” P4 expressed, “We expect peer-to-peer trading to be permitted by local authorities to allow energy generation and energy consumption at the same place. This could have a radical

effect on existing business models. Also, this will avoid any need for energy storage.” P5 expressed,

In the subsidy-free environment, it is difficult for smaller community groups to raise bank finance because they need a secure income stream. The way to solve this problem is to have a long-term power purchase agreement with the bankable party. The bankable parties could be local public sector bodies such as council or hospitals.

P6 stated,

We need to have a route to market. Rather than relying on the national government for their support, we work with local municipalities and councils. They can provide an opportunity to market the energy by having a long-term power purchase agreement with us. We are also exploring EV related services with local authorities to develop electric transport services for a long-term viable business model.

P7 expressed,

We are looking for new opportunities to have a long-term power purchase agreement with local organizations, we are exploring new opportunities in areas of energy efficiency, heat generation, and EV clubs. We are looking to diversify into new areas of energy services related business by working with local government.

P8 stated, “We are working with an organization called Energy Locals who is developing local energy network based on peer-to-peer trading.” Appendix I depicts inductively developed Theme 3 (opportunity realization) and participant responses.

Ties to conceptual framework. Recognizing opportunities and taking actions to

integrate them into the value chain to build-on new capabilities is one of the traits of entrepreneurship. Although opportunity recognition is considered an essential part of entrepreneurship, the purpose of this study was primarily focused on sustainable and social value creation opportunities in entrepreneurship. According to Hanohov and Baldacchino (2018), SE is about discovery, creation, and exploitation of opportunities related to goods and services for the community and environment issues. Sustainable entrepreneurs take calculated risks to capitalize on new opportunities (Kraus et al., 2018). Thompson et al. (2015) suggested sustainable entrepreneurs act as change agents to create a collaborative network and share business risks with other elements of that network. Sustainable entrepreneurs exploit new business opportunities to address social and environmental issues (Urbaniec, 2018). Hanohov and Baldacchino (2018) suggested opportunity identification and creation in SE are guided by four elements (a) environment and community knowledge, (b) motivation of personal gains, (c) altruistic values, and (d) entrepreneurial knowledge. Based on the above analysis, I observed that Theme 3 was strongly linked to the SE concept and its characteristics. Therefore, I found that Theme 3 underpins the conceptual framework from the perspective of the SE concept. In the following paragraph, I substantiate Theme 3 with past professional and academic literature reviews that is also corroborate by the current findings.

Ties to past and current literature. Community energy groups explore new opportunities in energy related services in addition to their primary role of energy generation. Business leaders of CECs are involved in bottom-up initiatives to create new opportunities to overcome business challenges that their organizations face (Hiteva &

Sovacool, 2017). Community energy groups in the United Kingdom partner with local authorities to create local energy tariffs for residential housings, and also address fuel poverty (Creamer et al., 2018). Business leaders of CECs explore energy services related opportunities which include (a) energy efficiency schemes, (b) energy-saving consultancies, and (c) EV charging and infrastructures (Herbes et al., 2017). Saintier (2017) suggested CEC leaders, as part of a shared ownership model, work with local actors and organizations to create new opportunities for viable business models in the absence of FIT support. Aligned with Theme 3, the business leaders of CECs in the United Kingdom use the following business practices (a) create new opportunities in energy efficiency related service; (b) explore opportunities in the long-term power purchase agreement; (c) explore local energy market based on the peer-to-peer trading concept; (d) explore possibilities on the demand-side response with the support of energy storage, and (e) work in the area of an EV charging and infrastructure.

Having substantiated Theme 3 with past professional and academic literature reviews, I corroborated Theme 3 with scholarly literature published in 2019. In research aimed to find new opportunities in the United Kingdom's community energy post FIT withdrawal, Mirzania et al. (2019), found that 25% of CEC leaders wanted to explore energy supply based business models through power purchase agreements, 20% of them wanted to have energy generation alongside battery storage, 12% wanted to have private wire arrangements while another 12% wanted to work on demand-side responses. According to Hewitt et al. (2019), decentralized and democratized energy generation offers opportunities to community energy groups to engage with their consumers; such

engagements can result in a new business opportunity where consumers are actively involved in demand-side management. In a decentralized energy system, community energy groups create a consumer-centric market as part of a bottom-up strategy by permitting them to take part in peer-to-peer energy trading (Sousa et al., 2019).

Community energy groups work in partnership with city councils, local authorities and commercial developers to create new opportunities (Mirzania et al., 2019). In the wake of FIT withdrawal, power purchase agreements with energy suppliers have emerged as an alternate route to market, some energy suppliers in the United Kingdom offer power purchase agreements to community generation projects (Willis & Simcock, 2019).

Theme 4: Growth Focused and Commercial Venturing

Leaders of the European Union, including the United Kingdom, have identified a critical role of CECs in achieving renewable energy targets (Saintier, 2017). The CEC leaders play diverse roles in supporting renewable energy projects; they have different organizational structures and varying levels of competencies in terms of resource utilization and project setups (Vancea et al., 2017). Participants expressed being profitable and achieving growth is imperative for them to support the social and environmental value creation process. Most participants agreed they are growth focused, created new assets, and are involved in commercial ventures; they also highlighted their role in providing financial and business advisory services to other community groups. Some participants also suggested playing the role of the intermediary organization to support the growth of community energy in the United Kingdom, helping individual members to raise their profile to scale up the business. P1 highlighted, “The surplus

income generated is diverted to the CIC part of the community benefit fund, the role of CIC is to maximize community benefit by creating new asset bases of renewable energy. We use CIC to bring investments in the community.” P2 stated,

We have been working on strategies to generate 20% of the electric demand of the city by 2030. That means a significant growth plan. We are also part of many advisory groups led by the local council. We also work on a green growth platform hosted by a local university.

P4 noted,

Carbon reduction is an important variable, but the interest rate given to shareholders is equally important. We carefully adjust this so that we can attract future investment; being able to generate the required profit in a sustainable manner and growth is very important.

P5 expressed,

We are not a for profit and mission led CIC company, we work with communities to set up their organizations, provide them with financial support, and help in energy generation. We have supported around 30 community groups to set up their organizations. Our mission is to help communities develop their anchor assets; we establish an asset to start a minimum scale of energy projects, which in-turn starts generating income. For a community energy group, it is important that they have a basic platform to scale up. Usually, these platforms have a 2-tier structure, and top companies could be a CBS or CIC while asset hold companies are CIC.

P6 highlighted,

We help community energy organizations to develop and grow their business by acquiring new assets. We have the commercial experience to understand what community energy groups must be paying for their assets and advising them on asset deals. We understand motivators and drivers of the commercial developers and community groups. We have been through many negotiations to help community energy buy assets from commercial developers. We work with many community energy groups having a great deal of potential to grow and have anchor assets to build-on.

P7 stated,

Our main objective is to create a supportive environment for community energy groups in Wales, where they can thrive and grow. We do this in different ways; we create a network of groups, provide a platform for them to grow, and work with the Wales government to ensure benefits are reaching to groups. We identify financial support needs, and we approach the Wales government or access other community banks to get easy loans. We play an enabling role to ensure community energy groups grow across Wales.

P8 stated, “We support community energy growth in Wales, we aim to raise the profile of community energy groups and seek to develop projects with partnerships with other organizations.” P9 highlighted, “We use social media, before each share offer. We organize stalls at the local market and at other community events in order to raise our public profile and attract funds and future investors.” Appendix J depicts inductively developed Theme 4 (growth focused and commercial venturing) and participant responses.

Ties to conceptual framework. Sustainable entrepreneurs maintain economic growth in their pursuit of social and environmental value creation; they create new assets to drive economic growth, business scale, and profits (Kraus et al., 2018). Sustainable entrepreneurs focus on economic growth with social and environmental aspects in mind (Soto-Acosta et al., 2016). Sustainable entrepreneurs create new assets for economic growth by utilizing funds from private equity and venture capitals (Sunny & Shu, 2017). Having established a link between Theme 4 and the financial aspects of SE, I also viewed Theme 4 from the new institutional norms that sustainable entrepreneurs create to legitimize their actions in their efforts to achieve growth. According to Gasbarro et al. (2017), in a multilevel model of the low-carbon-energy transition, sustainable entrepreneurs co-create new societal regimes and co-evolve new institutional arrangements. According to Thompson (2018), sustainable entrepreneurs use institutional change strategies to legitimize business ventures.

Ties to past and current literature. The leaders of intermediary organizations, as part of the community energy sector in the United Kingdom, play an active role to support community energy groups; the role includes managing and evaluating financing models and providing resources to set up new projects (Seyfang et al., 2014). Süsser et al. (2017) suggested renewable community energy business leaders develop a multi-nested organizational structure to grow in wider geographic locations, and also use hybrid business models to upscale their ventures. A report by Community Energy England (2018) suggested a lack of access to easy project financing was considered a significant barrier to community energy growth in 2017. Hall et al. (2016) suggested, in the United

Kingdom's market driven policy landscape, small community energy groups struggle to get support from financial institutions. Due to the lack of suitable policy support for CECs in the United Kingdom, business leaders create strategies to achieve growth and remain economically viable. The business leader of CECs in the United Kingdom use business practices which includes (a) creating and developing new financing models for anchor assets, (b) developing new institutional norms to achieve scalability, (c) taking up the role of financial and project execution advisor, and (d) working as intermediary organization to raise the profile of community energy sector.

Having substantiated Theme 4 with past professional and academic literature reviews, I corroborated Theme 4 with scholarly literature published in 2019. Due to the absence of any direct intervention from the national governments, the business leaders of CECs reconfigure social practice and institutional norms through hybrid strategies to succeed (Hewitt et al., 2019). Shared ownership models for CECs are just beginning in the United Kingdom; such arrangements involve community groups, commercial developers, and intermediaries; in this type of ownership, assets are divided between multiple parties (Mirzania et al., 2019). Prehoda et al. (2019) advocated financial models based on a partnership between community energy groups and commercial developers for the success of community projects. As part of the social innovation process, community energy groups reconfigure social practices and institutional norms to grow and challenge incumbents (Hoppe & De Vries, 2019). Leaders of community energy groups share knowledge and provide supports to set up new CECs (Magnusson & Palm, 2019).

Theme 5: Innovation and Shared Knowledge

The innovation process in the community energy sector is driven by a network of activities and organizations; such collective arrangements generate a bottom up solution to create values for the local communities (Smith, Hargreaves, Hielscher, Martiskainen, & Seyfang, 2016). The leaders involved in the community energy groups drive innovations through networks using social capitals and shared resources; the success of innovation depends on the networking capacities of leaders and their understanding of external circumstances and opportunities (Van der Waal, Van der Windt, & Van Oost, 2018). According to Seyfang et al. (2014), business leaders of CECs act as grassroots innovators who initiate technological or behavioral changes by involving civil societies, local authorities, universities, and energy companies. Smith et al. (2016), viewed community energy groups as a strategic niche who challenge conventional regimes through innovations related to (a) new organizational forms, (b) technological solutions, and (c) new markets.

Most participants stated that they are currently involved in innovation projects either related to adding a new value through a technological innovation or related to developing an innovative financing model to fund a project. P1 stated,

We have received ERDF (European Regional Development Fund) funding for innovation projects; such funds are very useful. We are working on a project to create a low carbon economy for our county by partnering with academics, local authorities, and SMEs. We are working with actors such as the local city council, two world-class universities, and a neighboring district council. We have a catalyst

role to play in this project. We are also working on an innovative project which aims to create a local energy market in our county, this project is about smart grid application in a real-world scenario, and we are collaborating with our partners in knowledge creation. We can make a significant impact if every time we learn and share our findings so others can replicate. The energy market is complex; it is an interactive landscape of policy, technology, and society.

P2 highlighted,

We are working on an innovation project by partnering with our local council and the university; this project deals with installing EV charging facilities in the city powered with solar panels. This project aims to create a new bust of revenue in the daytime. We also explore innovative methods for securing project funding for new projects; crowdfunding has come up as a creative way to secure finance in the community sector. Also, it has been a low source of risk for investors. Participant P3 suggested, “We also explore crowdfunding platforms to secure funds; currently, people are willing to invest in our community group.”

P4 stated,

We are part of an action group involving local city council, other elements of local ecosystems on a city transition project. The project aims to create a sustainable future for the local community. The action group also aims to create opportunities to add new values in the existing communities by deploying renewable technologies.

P5 highlighted,

Developing an anchor asset for the community group does not involve any technical innovation. Still, the innovation in this type of work has been securing commercial scale of finance into social enterprise and getting commercial funders happy to invest in community projects and demonstrating that we can do that at large scale. So, innovation has been using an approach that a commercial developer will use to create new assets by using methods of securing finance.

P6 suggested,

We are looking at various ways to secure finance. Most recently, we have collaborated with a social enterprise bank to raise 4 million pounds for one of our solar farm projects. We used an innovative finance option in the form of a bond instrument that generates tax-free interest. In this case, small retail investors can invest in bond instruments hosted on the bank's online platform. We could attract small retail investors to raise the fund.

P7 stated,

We are working with an organization that aims to create innovative ways to enable people use locally generated energy at a reasonable cost. The organization has developed a model that allows them to set a local energy tariff. This help us create a local energy market. Already ten community energy groups are willing to adapt to this model and scale-up their operation. Our main role is to facilitate innovative concepts and provide them a platform to link with community groups.

P8 highlighted,

It is a really difficult time for community energy in the UK, there are fewer resources for the growth, but same time we should be driven by new ideas and innovations such as EV charging, energy clubs, etc. We work in innovative projects like EV charging points and local energy clubs related to peer-to-peer energy trading.

Appendix K depicts inductively developed Theme 5 (Innovation and shared knowledge) and participant responses.

Ties to conceptual framework. Sustainable entrepreneurs utilize the business ecosystem to create innovative ideas and shared knowledge to support the business objectives. Sustainable entrepreneurs also take a lead role to ensure other actors of the ecosystem adopt such innovative concepts and knowledge. Innovation is an essential element in the SE practice; innovative actions of sustainable entrepreneurs are the driving force for the SE conceptualization (Kraus et al., 2018). Sustainable entrepreneurs apply innovative practices in the process of the sustainability transition to achieve technological improvement (Urbaniec, 2018). From the multilevel perspective of the low-carbon-energy transition, innovative sustainable entrepreneurs create new opportunities to work with public authorities and large market players in the co-evolution of the energy transition process (Gasbarro et al., 2017).

It was evident that Theme 5 was strongly tied to the SE concept and the trait of sustainable entrepreneurs who create and test innovative concepts and share knowledge with other actors of the ecosystem. I used the lens of the QH model to view the findings from Theme 5 of creating shared knowledge through the partnership of local authorities,

universities, and other actors of the ecosystem. Carayannis and Grigoroudis (2016) stated in the QH model; citizen groups take a lead role to drive innovation processes by partnering with the other three elements academia, government bodies, and businesses. Intermediary organizations led by civil societies play an essential role in bridging the gap with shared knowledge utilizing social capital and resource from the other three actors of the QH model (Van Horne & Dutot, 2017). According to García-Terán and Skoglund (2018), the interplay among different actors of the QH model enables the commercialization and diffusion of renewable energy technologies and services.

Based on the above analysis, I observed that Theme 5 was linked to the SE concept and, also strongly grounded in the QH model of innovation. Therefore, I found that Theme 5 underpinned the conceptual framework from perspectives of both the (a) SE concept and (b) QH model. In the following paragraph, I substantiate Theme 5 with past professional and academic literature reviews that is also corroborate by the current findings.

Ties to past and current literature. The decentralized structure and evolving technologies in the renewable energy sector necessitate business leaders to drive the innovation process for the value creation by adopting a collaborative approach (Werker et al., 2017). Due to market-driven policy support in the United Kingdom, small energy community groups face difficulties in securing finance from large financial institutions (Hall et al., 2016). Therefore, business leaders are required to explore innovative financing models of the commercial scale. Dilger et al. (2017) suggested crowdfunding platforms supported by social enterprise banks allow retail investors to invest in

community projects; also, the equity-based options, permit individuals to gain membership of energy cooperatives are the most prevalent. The business leaders of CECs in the United Kingdom use business practices related to shared knowledge and innovation. Such practices include (a) creating shared knowledge in the partnership with city councils, universities, and industry actors; (b) exploring new technical solutions in the area of the local energy market and peer-to-peer trading, and (c) creating and replicating innovative financial models by partnering with social enterprise banks.

Having substantiated Theme 5 with past professional and academic literature reviews, I further corroborated Theme 5 with scholarly literature published in 2019. The business leaders of CECs in the United Kingdom look forward to developing innovative business models for future growth; main areas of innovation include (a) long-term power purchase agreement, (b) energy storage, and (c) local energy trading (Mirzania et al., 2019). According to Hewitt et al. (2019), community energy leaders are involved in a wide range of grassroots innovations, which include (a) transition towns, (b) community sustainability initiatives, (c) energy roundtables, and (e) low carbon economy. Leaders of CECs foster innovative practices by collaborating with the network of actors and bring new technological innovations into the market (Sait et al., 2019). Based on the principle of community-engaged research, community energy groups collaborate with research institutions, local bodies and other energy companies to bring the necessary resources and knowledge into business (Prehoda et al., 2019). As part of social innovation, community energy groups collaborate with actors of ecosystems to work on various techno-economic innovative schemes to meet social goals (Hoppe & De Vries, 2019).

Applications to Professional Practice

The purpose of the research was to find strategies that leaders of CECs in the United Kingdom apply to create values through business models driven by innovative ecosystems and ventures. My aim was to solve the business problems of CEC leaders in the United Kingdom by creating new knowledge and enabling them to apply research findings in the value creation process. Based on data analysis, I identified five themes (a) purpose-driven entity with actions to multiply impact, (b) collaboration and partnership, (c) opportunity recognition and realization, (d) growth focused and commercial venturing, and (e) innovation and shared knowledge. The themes were strongly linked with the conceptual framework, that was based on the theoretical triangulation of (a) SE concept and (b) QH model. I observed that three themes, (a) purpose-driven entity with actions to multiply impacts, (b) opportunity recognition and realization, and (c) growth focused and commercial venturing were grounded in the SE concept. Additionally, I observed two other themes (a) collaboration and partnership and (b) Innovation and shared knowledge were connected to both the SE concept and QH model. Based on the emerging themes, I can argue that successful business leaders of CECs in the United Kingdom use entrepreneurial and innovative practices in their business transactions to create values.

The findings could be beneficial to the leaders of CECs in the United Kingdom who are currently struggling to survive and sustain their profits in the absence of any financial incentives such as FIT subsidies. As the community energy policy support in the

United Kingdom is gradually drifting towards a market-driven and subsidy-free environment, the leaders can learn and apply entrepreneurial and innovative practices to achieve their business objectives. During interviews, many participants highlighted that due to falling renewable energy cost and the lack of financial subsidies from the government, the traditional business models based on small-scale solar generation are no longer viable. Therefore, leaders of CECs explored new revenue streams in energy related services such as (a) energy efficiency, (b) EV charging, and (c) energy storage.

The leaders of CECs can work in shared ownership models to set up a commercial-scale project of high capacity. The current energy policy in the United Kingdom does not allow community energy groups to sell energy in the market. However, leaders of CECs can practice long-term power purchase agreements with local authorities to create new markets for themselves to support a viable business model. Participants also expressed that in the United Kingdom's present energy regime, most CEC leaders face difficulty in securing funds for projects. Based on findings, the leaders of CECs can create new alliance with social enterprise banks to explore innovative financial models for the commercial scale of funding. The CEC leaders also explored crowdfunding platforms for project financing as an alternate source of funding. The business practices based on citizen engagement found to be prevalent with CEC leaders; as leaders aim to deliver social, environment, and economic values to local societies where they operate. The findings can also provide insight to the United Kingdom's community energy policymakers and help them to recalibrate their policies to support grassroots innovation. Most participants stated that they play an active role in

collaborative research by partnering with local authorities, universities, and other actors of the ecosystem. Sustainable energy transition poses social and technical barriers; community energy groups play an essential role in overcoming such barriers through collaborative innovation and shared knowledge (Hoppe & De Vries, 2019; Magnusson & Palm, 2019).

Based on the findings, the United Kingdom's community energy policymakers can enable community energy groups to take-up a catalyst role in driving collaborative innovations involving different actors of the ecosystem. In contrast to England, due to the devolution of central power, the Wales policymakers have made an element of community ownership mandatory for all renewable projects from 2020. Such policy enactment by local authorities in England can bring much-needed opportunity to CECs. The findings also highlighted the important role of universities in commercializing innovations. Several participants stated they work with local universities on pilot projects aimed to overcome sustainable transition challenges and explore new business models. University research groups in the United Kingdom, as part of social responsibility, can collaborate with community energy groups in their areas to make a valuable contribution in grassroots innovation. Although the research findings are relevant in the United Kingdom's context, the practices followed by leaders of CECs can be applied to other countries in Europe that have similar community energy policy supports. Additionally, the research findings can provide a realm of knowledge for business leaders in developing countries who want to set up a profitable CEC.

Implications for Social Change

Community energy groups, in their efforts to contribute to the energy transition process, create new forms of decentralized and democratically governed energy systems through active citizen engagement (Magnusson & Palm, 2019). Community energy groups through social innovation make positive social impacts in their local communities, such positive social impacts include (a) behavioral changes of energy users, (b) alleviation of fuel poverty, (c) use of energy-saving practices, and (d) stimulation of local economy (Hoppe & De Vries, 2019). The knowledge derived from this research could enable leaders of CECs to learn new strategies that create a multiplying effect on social benefits that leaders provide to local communities.

The community benefit funds set up with an aim to reinject profits into the local community by business leaders of CECs in the United Kingdom were found to be the most successful method of creating social changes in local communities. Using such community benefit funds, the leaders of CECs created social values in the areas of (a) energy efficiency and (b) citizen empowerment. The findings related to innovation and shared knowledge could enable leaders of CECs to understand the importance of a bottom-up approach in addressing social and environmental challenges through collaborative research. The findings could also help CEC leaders in other developing countries to understand the critical role they must play in creating a triple bottom line solution for the community where they operate.

Recommendation for Action

The objective of this research was to solve the business problem of some leaders of CECs in the United Kingdom by exploring successful strategies for value creation through business models driven by innovation ecosystems and new ventures. Participants were business leaders of CECs in the United Kingdom who have successfully used business model innovation strategies for value creation. I established a strong tie between the five themes observed during data analysis and the conceptual framework of this study. Therefore, I construe that successful leaders, used entrepreneurial and innovative practices in their business strategies to create values.

Based on the findings of this study, I have recommendations for action relevant to (a) leaders of CECs and (b) policymakers of the United Kingdom's community energy sector. My recommendations for leaders of CECs are to (a) explore new opportunities in energy service-related business through citizen engagement, (b) collaborate with local actors for long-term power purchase agreement, (c) partner with commercial developers to setup large scale solar farms, and (d) raise the profile of community group by developing sector knowledge and leadership skills and also take-up innovative pilot projects. My recommendations for the policymakers are to (a) enact new policies to ensure a certain degree of community ownership in all the renewable energy projects, (b) permit community energy groups to access the energy market, and (c) create a support system for CECs to access commercial scale of funding.

Upon obtaining approval of this study from the chief academic officer, I will share the findings of this research with the community energy groups in the United

Kingdom. I will also publish the results of this study in scholarly journals and make presentations of research findings at seminars on the community energy sector. The findings and recommendations may serve as a guide for business strategies related to the community energy sector and local energy initiatives in general.

Recommendations for Further Research

Energy policies are country-specific, and the local government authorities drive the policy support for CECs, therefore, community energy support systems vary widely across countries. I conducted this study with a focus on the United Kingdom's policy support. Thus, the applicability of the research findings to other European countries having similar policy supports as that of the United Kingdom may be possible. However, to understand business strategies in the country-specific energy landscape driven by the interactions between policy, society, and technologies, I recommend country-focused research.

During this research, I observed two new market concepts (a) power purchase agreements and (b) peer-to-peer trading related to CECs in the United Kingdom. These new concepts could help leaders to develop long-term viable business models. However, such market concepts are new and evolving; there are limited scholarly works in these areas. Therefore, I recommend further research in these two areas with a focus on the United Kingdom's energy market, especially covering the topics like (a) pricing basis and (b) terms of the contract.

Reflections

With an oil and gas background, I wanted to learn about a new form of renewable energy generation led by civil societies. The complex interaction between renewable energy, society, and market, motivated me to explore the strategies that business leaders of community energy groups use to create values. The DBA process gave me an opportunity to conduct this research and gain an in-depth understanding of strategies that business leaders of CECs in the United Kingdom use to create values in their business. The research topic related to strategies for business model innovation in the community energy sector in the United Kingdom has become very relevant in the present scenario due to the gradual withdrawal of subsidies and tax benefits. Most participants expressed that the purpose statement of this research is very current and applicable to the community energy sector in the United Kingdom. Throughout the data collection process, including informed consent, interviews, and member checking, all participants from the United Kingdom's community sector were willing to extend their support and contribute to the new knowledge. I also learned that the community energy sector's evolution in the United Kingdom is driven by the complex interaction between policy, people, and the market. The research finding provided insight into the United Kingdom's community energy sector, where business leaders are willing to apply entrepreneurial and innovative practices to create values in their business.

Conclusion

The purpose of this qualitative multiple case study was to explore the strategies the leaders of CECs employ to create value through business models driven by

innovation ecosystems and new ventures. The targeted population consisted of business leaders from CECs in the United Kingdom who have successfully created value. The business leaders who qualified to participate in this study must have successfully implemented innovative business models in the last 5 years in any one of the areas (a) demand-side energy services, (b) shared ownership models with private developers, or (c) new ventures with business ecosystem partners. I selected nine participants from six CECs in the United Kingdom. During interviews, most participants raised their concern about long-term business viability in a subsidy-free environment. However, all the participants had a positive outlook about their business prospects due to carbon neutrality actions ramped up by local authorities. Most participants were willing to partner and collaborate with local councils and actors of the ecosystem to create and realize new opportunities to grow.

During the interviews, Participants highlighted emerging business concepts in the community energy sector which included (a) large commercial solar farms are more profitable; (b) power purchase agreements provide new markets; and (c) energy related services can add new revenue streams. Participants also stated that they represent purpose driven not-for-profit organizations aimed at creating social, environment, and economic values through citizen engagement. I identified five themes (a) purpose-driven entity with actions to multiply impacts, (b) collaboration and partnership, (c) opportunity recognition and realization, (d) growth focused and commercial venturing, and (e) innovation and shared knowledge. Building on the findings, I conclude, irrespective of the present unfavorable landscape for the community energy sector in the United Kingdom, the

outlook of business leaders of CECs remains positive. The business leaders of CECs in the United Kingdom are willing to apply entrepreneurial and innovative practices in their business to (a) take up new opportunities, (b) explore new financing models, and (c) create new knowledge.

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Appendix A: Interview Questions

1. What strategies does your community energy use to create value through business models driven by innovation ecosystems?
2. What strategies do you employ to address business model problems, such as collaboration, crowdfunding, and partnership?
3. How do you track the strategies' efficacy of creating the scalable business models?
4. How have you mitigated resistance, within the community energy cooperative, to implement new strategies?
5. How do you overcome any strategic challenge that you face in shared ownership model with private developers and local municipalities?
6. What additional information can you share about the strategies that you used within the community energy cooperative to create successful business models driven by innovative ecosystems?

Appendix B: Interview Protocol

1. Introduce self to the participant(s) and exchange greetings.
2. Present consent form, go through the contents, explain the purpose of the interview and answer questions. Also, address any concerns participant(s) may have.
3. Give participant copy of informed consent form.
4. Confirm or reconfirm the participant consented to participate, using the consent letter.
5. Ensure the recording device is ready and obtain their permission for the recording.
6. Turn on the recording device.
7. Start the note-taking process using coded identification; note the date and time.
8. Begin the interview with question #1; follow through to the final question.
9. Ask follow-up with additional questions.
10. End interview by thanking the participant(s) for taking part in the study.
11. Discuss member checking with the participant(s), obtain their contact details like emails/phone numbers for any follow-up questions and sharing interview summary.
12. End protocol.

Appendix C: Theme 1—Purpose-Driven Entity

Theme	Participant response
Purpose-driven entity	<p>P1: We are social enterprise aim to meet our energy needs in a way that's good for people and good for planet, we don't think these are mutually exclusive, we use a '4 P' framework for social impact assessment, we have measures that include 1) carbon saving, 2) prosperity in terms of saving, 3) number of people involved and membership grown and 4) stakeholder perception.</p> <p>P2: We create triple-bottom-line values of social, economic, and environment. We are driven by environmental value to decarbonize the energy system; social and economic value is equally important for us.</p> <p>P3: Solar panel hosting organizations benefit from been part of our green supply chains, We help in terms of reducing carbon emissions. We work in schools and influence them to adapt to renewable energy.</p> <p>P4: We aim to create value for our community shareholders, also we aim to meet the social needs of the community as well.</p> <p>P6: All projects run for community purpose; they are different from regular companies that run for the benefit of shareholders; all the project we work has a mission focused on community purpose at their heart. We create three values, social, economic, and environment.</p> <p>P8: We aim to create social, economic, and environmental values through community energy projects, Wales govt. has recognized the value of local ownership of energy and, also recognized the importance of creating social, environmental and economic values by engaging local communities.</p>

Appendix D: Theme 1—Actions to Multiply Impact

Theme	Participant response
Actions to multiply the impact	<p>P1: The multiplier effect we create by re-investing into local communities. People think being a social enterprise, we are not interested in profit, but in fact, we are interested in squeezing every single penny we can to increase our profit, which we can then be used with a purpose.</p> <p>P3: There are community energy funds we provide grants, provide money to overcome fuel poverty, etc., also create social and environmental values for the local community.</p> <p>P5: The main benefit is to generate a surplus profit to support the social purpose of the community. There is a carbon multiplier effect; there is also an opportunity to recycle the fund for carbon reduction initiatives that the commercial finance market will not fund.</p> <p>P7: The main reason for CBS is used to raise a significant amount of money locally. It creates a multiplying effect; the profit in the form of annual interest goes back to the local community and, also surplus amount goes back to community funds.</p> <p>P8: We have purpose-built community funds; lots of financial benefits go back to the community instead of going to big energy companies.</p> <p>P9: Our surplus income goes to community funds as mandated by CBS guidelines; we use this funding model to create social values to educate energy users about fuel poverty and energy efficiency.</p>

Appendix E: Theme 2—Collaboration and Partnership (Shared Value)

Theme	Participant response
Collaboration and partnership (shared value)	<p>P1: We largely worked on a collaborative and partnership basis. We are extremely lucky that our local city council is very cooperative and forward thinking and proved a very collaborative partner. In these partnerships, we look for synergy to create values; we are working with some good partners who have experience in the energy system.</p> <p>P2: We collaborate with local authorities, as they are developing a renewable energy strategy for the city.</p> <p>P4: Any business model innovation, developed within a collaborative environment, will have shared value for a complete ecosystem.</p> <p>P5: We collaborate with social enterprise banks to create shared values; they are socially driven organizations engage with the local community and keep some cost of finance within the community.</p> <p>P7: We collaborate with local govt. In shaping the supports and enable community groups to grow, we are working with local authorities to create new opportunities. We are also exploring opportunities to develop community energy projects in shared ownership.</p> <p>P8: We share our previous experience on a specific problem related to community energy projects to a broader group of members and support them learn by sharing our expertise.</p>

Appendix F: Theme 2—Collaboration and Partnership (Funding)

Theme	Participant response
Collaboration and partnership (for funding purpose)	<p>P1: Renewable project requires significant upfront capital; we are lucky that we have a strong partnership with the local city council. They have given us a short-term debt financing facility, which means we can withdraw funds when we have an opportunity.</p> <p>P4: we work in partnerships with councils, we are working in a shared ownership model with local city council who will collect revenue on our behalf.</p> <p>P5: We have set up a renewable energy community with support from the local city council, which had a very supportive and cooperative councilor. The council provided seed funding and resources to set up the community energy; they outsourced council energy advisors team into the newly founded energy community with services contract to cover this cost.</p> <p>P7: We have a strong relationship with Wales government; they provide practical support in the form of government-driven energy support services. They also offer development loans to start projects if the project fails to take off, then CECs don't have to repay this loan there is no risk for them and local govt. takes the risk</p> <p>P9: With the withdrawal of the FIT regime, we collaborate with local authorities to raise the profile of community groups in the London area. We also secured a grant for our latest project from the carbon offset fund of a well-reputed airline as part of their low carbon initiative.</p>

Appendix G: Theme 2—Collaboration and Partnership (Business Viability)

Theme	Participant response
Collaboration and partnership (for business viability)	<p>P1: We are collaborating with the National Energy Foundation and RetrofitWorks in supporting individual householders in the county interested in improving the energy efficiency of their homes. In our partnership, we help the local community in creating efficient ways of energy-saving, also provide vision and solutions to improve energy efficiency in residential buildings.</p> <p>P2: We are working with the city council for school programs, we have installed solar panels at nine school sites and with university installing panels at three sites</p> <p>P4: We collaborate with outside community energy groups based in other cities. Sometimes, they provide useful business contacts.</p> <p>P5: We are keen to collaborate with local authorities in the area of a long-term power purchase agreement. This will serve two purposes 1) they can achieve their carbon reduction goals by buying energy on a long-term basis of 15-20 years from community basis and 2) we can get an alternate of Feed-in-tariff in the form of long-term price agreement to make a viable business model.</p> <p>P6: Local authorities and councils are willing to provide a route to market for the power. Now Feed-in tariff is withdrawn; this gives us new opportunities to have creditworthy partners for the long-term power purchase agreement to ensure secured income.</p> <p>P7: There was a FIT subsidy, and now it is being withdrawn. We are collaborating with Wales government to create new opportunities in the community energy sector where profit generated remains within the local communities.</p> <p>P8: We work with a lot of stakeholders and organizations. We work with schools, energy clubs. We work with projects having trusted solar panel installers and solution providers.</p>

Appendix H: Theme 3—Opportunity Identification

Theme	Participant response
Opportunity identification	<p>P1: With FIT being withdrawn, we are looking for new ways to create value. We are looking at different propositions, which include micro balancing of existing PVs by combing with batteries to shift energy with time and demand, in future, the value will come from shifting energy supply with demand time.</p> <p>P2: Because of climate emergency declared by our local city council there are many new opportunities expected to come; we have a good understanding of financial and business matters so we can identify new opportunities.</p> <p>P4: We are also taking a calculated risk to remain profitable in the business, also there no risk-free business model. The city council has recognized the climate emergency and is willing to take action on climate change. In case we have a viable business model, they support us.</p> <p>P5: We saw an opportunity to buy a Solar farm developed by a commercial developer. We managed to negotiate the purchase of a solar farm from a commercial developer and convert this into a community energy group. We funded the purchase deal with a short-term loan of 11 million pounds.</p> <p>P6: We are looking for any opportunity which can provide us a viable business model. Now solar farms look viable because the cost of solar-based renewable energy has fallen substantially. A large-scale solar farm can be profitable in a subsidy-free environment.</p> <p>P7: Wales government declared 70% of renewable energy target by 2030, 1 gigawatt capacity from locally generated sources, and the element of local ownership from 2020 in all renewable energy projects. These policy supports will create new opportunities for CECs in Wales.</p> <p>P9: In the absence of FITs (or equivalent support from the government), we will need to focus on larger solar farms to have a viable business model.</p>

Appendix I: Theme 3—Opportunity Realization

Theme	Participant response
Opportunity realization	<p>P1: We are currently running a project called "Cosy Homes" in our county, which aims to reduce overall domestic energy consumption. We help the local community by providing vision and solutions to improve energy efficiency in residential buildings. We are also exploring the SME market in terms of energy efficiency solutions.</p> <p>P2: We are working for EV charging project with the local city council to explore new business opportunities; we also want to develop and buy solar farms, in order to sustain our business.</p> <p>P4: We expect peer-to-peer trading to be permitted by local authorities to allow energy generation and energy consumption at the same place. This could have a radical effect on existing Business Models.</p> <p>P5: In the subsidy-free environment, it is difficult to raise bank finance because they need a secure income stream. The way to solve this problem is to have a long-term power purchase agreement with the bankable party. These bankable party could be local public sector bodies such as council or hospitals.</p> <p>P6: We need to have a route to market. Rather than relying on the national government for their support, we work with local municipalities and councils. They can provide an opportunity to market the energy by having a long-term power purchase agreement with us. We are also exploring EV related services by working with local authorities to provide electric transport services for a long-term viable business model.</p> <p>P7: We are looking for a new opportunity to have a long-term power purchase agreement with local organizations. We are exploring new opportunities in areas of energy efficiency, heat generation, and e-vehicle clubs.</p> <p>P8: We are working with an organization called Energy Locals who is developing local energy network based on peer-to-peer trading.</p>

Appendix J: Theme 4—Growth Focused and Commercial Venturing

Theme	Participant response
Growth focused and commercial venturing	<p>P1: The surplus income generated is diverted to CIC part of community benefit fund, the role of CIC is to maximize community benefit by creating new asset bases of renewable energy. We use CIC to bring investments in the community.</p> <p>P2: We have been working on strategies to generate 20% of the electric demand of the city by 2030. That means a significant growth plan. We are also part of many advisory groups led by the local council. We also work on a green growth platform hosted by a local university.</p> <p>P4: Carbon reduction is an important variable, but Interest rate given to shareholders is equally important. We carefully adjust this so that we can attract future investment; being able to generate the required profit in a sustainable manner and grow is very important.</p> <p>P5: We are not-for-profit and mission-led CIC company, we work with communities to set up their organizations, provide them with financial support, and help in energy generation. We have supported around 30 community groups to set up their organization. Our mission is to help communities to develop their anchor assets; we establish an asset to start a minimum scale of energy projects, which in-turn start generating income. For a community energy group, it is important that they have a basic platform to scale up. Usually, these platforms have a 2-tire structure, and top companies could be a CBS or CIC while asset hold company are CIC.</p> <p>P6: We help community energy organizations to develop and grow their business by acquiring new assets. We have the commercial experience to understand what community energy groups must be paying for their assets and advising them on asset deals. We understand motivators and drivers of the commercial developers and community groups. We have been through many negotiations to help community energy buy assets from commercial developers. We work with many community energy groups having a great deal of potential to grow and have anchor assets to build-on.</p> <p>P7: Our main objective is to create a supportive environment for community energy groups in the wales, where they can thrive and grow. We do that in different ways; we create a network of groups, provide a platform for them to grow, work with the Wales government to ensure benefits are reaching to groups. We identify financial support needs, and we approach Wales govt or access other</p>

community banks to get easy loans. We play an enabling role to ensure community energy groups grow across Wales.

P8: We support community energy growth in Wales, we aim to raise the profile of community energy groups, seek to develop projects with partnerships with other organizations.

P9: We use social media, before each share offer. We organize stalls at the local market and at other community events in order to raise our public profile and attract funds and future investors.

Appendix K: Theme 5—Innovation and Shared Knowledge

Theme	Participant response
Innovation and shared knowledge	<p>P1: We have received ERDF (European Regional Development Fund) funding for innovation projects, such funds are very useful. We are working on a project to create a low carbon economy for our county by partnering with academics, local authorities, and SMEs. We are working with actors such as the local city council, two world-class universities, and a neighboring district council. We have a catalyst role to play in this project. We are also working on an innovative project to create local energy market in our county, and we are collaborating with our partners in knowledge creation. We can make a far bigger impact if every time we learn and then share our findings so others can replicate. The energy market is complex; it is an interactive landscape of policy, technology, and society.</p> <p>P2: We are working on an innovation project by partnering with our local council and the university; this project deals with installing EV charging facilities in the city powered with solar panels. This project aims to create a new bust of revenue in the daytime. We also explore innovative methods for securing project funding for new projects, crowdfunding has come up as a creative way to secure finance in the community sector; also, it has been the low source of risk for investors.</p> <p>P3: We also explore crowdfunding platforms to secure funds; currently people are willing to invest in our community group</p> <p>P4: We are part of an action group involving local city council, other elements of local ecosystems on a city transition project; the project aims to create a sustainable future for the local community. The action group also aims to create opportunities to add new social and environmental values in the existing communities by deploying new renewable technologies.</p> <p>P5: Developing an anchor asset for community group do not involve any technical innovation, but the innovation in these type of work has been securing commercial scale of finance into social enterprise and getting commercial funders happy to invest in community projects and demonstrating that we can do that at large scale. So, innovation has been using an approach that a commercial developer will use to create new assets by using various methods of securing finance.</p> <p>P6: We are looking at various ways to secure finance. Most recently, we have collaborated with a social enterprise bank for one of our solar farm projects to raise 4 million pounds. We used an innovative finance option in the form of a bond instrument that generates tax-free interest.</p>

In this case, small retail investors can invest in bond instruments hosted on the bank's online platform. We could attract small retail investors to raise the fund.

P7: We are working with an organization that aims to create an innovative way to enable people to use locally generated energy at a reasonable cost. They have developed a model that allows them to set a local energy tariff. This allows for creating a local energy market. Already ten organizations are willing to adapt to this model and scale their operation. Our main role is to facilitate innovative concepts and provide a platform for linking them with community groups for adoption.

P8: It is really difficult time for community energy in the United Kingdom, there are less resources for the growth, but same time we should be driven by new ideas and innovations such as EV charging, energy clubs etc. We work in innovative projects like EV charging points and local energy clubs related to peer to peer energy trading.
