

ABSTRACT

PARK, JINOH. Increased Opportunities for Supporting Continuing Care Retirement Community Stability through Designed Built Environment with Supportive Services (Under the direction of Dr. Rider, Traci Rose).

This research explores to support Continuing Care Retirement Communities (CCRCs) from a design aspect. As the growth of the aging population and public interests in wellbeing, more needs for senior specialized living facilities have emerged. In response to the needs, diverse types of senior living facilities have appeared in the retirement community industry, and CCRCs have accounted for almost half segmentation of the industry since 2017.

However, there is a lack of support for the CCRC development and operation legally, professionally, and scholarly; only some state governments have CCRC related rules and regulations in the absence of CCRC rules and regulations at the federal governmental level; there is no general CCRC facility guideline in practice; there is limited research about CCRCs. Furthermore, there is a hesitation of investment for CCRC development. Therefore, even though CCRCs have recorded an overwhelming market result reflecting seniors' favors, there is a necessity to synthesize and address the overall lack of supports addressing how to guide and help the CCRC development and operation.

This dissertation aims to understand the current limitation of governmental, professional, scholarly supports for CCRCs in general, synthesize their prioritized concerns in the supports across the three sectors, then tries to address the synthesized concerns. This dissertation is consist of three articles: 1) Synthesizing Common Concerns in Rules and Regulations, Guidelines, and Research for Built Environments in Continuing Care Retirement Communities, 2) Exploring Relationships between Finance and Design in Continuing Care Retirement Communities in North Carolina: An Investigation of the Built Environment and Supportive Services, and 3)

Supporting Continuing Care Retirement Community Stability through Design of the Built Environment.

The first article synthesized common concerns across the three sectors from state governments, professional organizations, and research portals through a systematic archive review. As a result, the first article identified two common concerns with how to address 1) continuing CCRC operation, especially about the financial stability of CCRCs to provide life-long care to residents (seniors) by avoiding bankruptcy and 2) developing a sense of community, particularly about how to encourage residents to engage each other without depression.

The second article, as the following study, explores to help the financial feasibility of CCRCs by investigating North Carolina CCRCs from the theoretical perspective of the program evaluation. As a result of this exploration, this paper indicates that successful CCRCs in North Carolina provide all levels of care including Independent Living, Assisted Living, Nursing Home, Dementia care service, supportive services specifically including swimming pools, spas, or saunas and invite residents of the CCRC to be represented on the board of directors.

The last article goes deeper in terms of the financial feasibility of CCRCs than the previous article, exploring the built environmental elements of CCRCs to achieve financial stability. This paper also investigated North Carolina CCRCs by limiting location and provided services. By answering a question that what characteristics of CCRC built environment may relate to increased opportunities for financial stability, this exploration indicates that CCRCs with the increased opportunities in North Carolina metropolitan areas have an even more specific range of total residential unit numbers.

Consequently, this dissertation proposes a CCRC guideline for future development and maintenance by synthesizing three articles above. Even though the guideline cannot provide

statistically significant evidence because of a small number of CCRC samples, this dissertation is significance as exploratory research with limited resources in this CCRC field by generating hypotheses for future research.

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Increased Opportunities for Supporting Continuing Care Retirement Community Stability
through Designed Built Environment with Supportive Services

by
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DEDICATION

To my family who believed in my decision to study abroad, my advisor who allowed me to begin and achieve this Ph.D., and my Damhui who loves me.

Damhui, would you marry me?

BIOGRAPHY

Jinoh Park is from Seoul, Korea. Jinoh received his B.S. in interior design from the Hanyang University in 2007; during his undergraduate study, he worked for a design firm “jay is working” as an interior designer from 2005 to 2007. After the graduation with ROTC training, he served in the Republic of Korea Army as a lieutenant from 2007 to 2009. At the end of his military career, he experienced in architecture firms in Europe, returned to Korea, and worked as a senior interior designer specializing in strategic planning at EJ C&D from 2010 to 2016. While working for EJ C&D, he finished his MBA at Seoul School of Integrated Sciences & Technology and EMBA at Aalto University, Helsinki, Finland. Through his master program, he founded a craft company that collaborates with Korean traditional knot makers and developed an economic perspective of design. Based on the above process, he decided to begin his Ph.D. program aiming to explore how to balance the economic feasibility and resident satisfaction in the built environment.

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원하는 도전을 하게 되었습니다. 정말 감사드려요. 나의 어머니 “김명희”님. 회사를 그만두고
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CHAPTER 1: Introduction

Problem Background

Given the declining fertility rate, increased life expectancy, and the aging baby boomer generation, U.S. seniors older than sixty-five will number approximately ninety-five million, or twenty-three percent of the national population, in 2060 (Vespa, Armstrong, & Medina, 2018). Moreover, if people continue to grow old, they will enter the senior population eventually. Designing built environments for this specific population is a unique opportunity to positively influence seniors' health and wellness (Kerr et al., 2012; Urban Land Institute, 2013; Yen & Anderson, 2012). Because of changes in the physical abilities of the senior population (Christenson, 1990), particularly in struggling with health changes and everyday housework such as taking out the trash (Liepelt, 2016), seniors are often motivated to relocate from their existing houses to residential environments designed specifically for their needs.

Among the types of residential environments for seniors, Continuing Care Retirement Communities (CCRCs) offer a full range of care services in one place (Zarem, 2010) including considerations for Independent Living, Assisted Living, and Nursing Home environments. Despite the CCRC concept entering the senior living market in the 1960s (Zarem, 2010), there are still no facility guidelines for these facilities (Facility Guideline Institute, 2018), rules and regulation at the federal governmental level for CCRCs (United States Government Accountability Office, 2010), or adequate research data to create better places for seniors (Park & Rider, 2017). Even with this lack of guidance and support for the CCRC development and maintenance process, however, the CCRC has been the leading senior living trend since the beginning of 2010 (Curran, 2018; Johnston, 2015), reflecting seniors' preference for living

choices (Ejaz & Schur, 2003). Keeping with this trend, CCRCs have been built consistently (Peck, 2018) despite a lack of guidance and regulations in CCRC development and maintenance.

Study Purpose

This study aims to support the CCRC development and operation processes through a lens of the built environment, proposing an initial set of suggestions for future development. This dissertation explores archival data related to CCRC operation and success, particularly focusing on the impact of the built environment and supportive services. This research suggests a recommendation for future CCRC development and operation by distinguishing between “desirable” and “undesirable” elements of the CCRC built environment and supportive services, as related to historical occupancy rates and financial viability. The research focuses on exploring how design practitioners who design and build CCRC facilities may provide greater satisfaction to all CCRC stakeholders by establishing a conceptual connection linking the built environment and supportive services of CCRCs to the occupancy rates of CCRCs. Through this outlined connection, design practitioners may better design the built environment and supportive services for CCRCs, contributing to both investor satisfaction through occupancy rates and to occupant satisfaction. Furthermore, design practitioners will be able to propose CCRC designs supporting the financial health of CCRCs for new CCRC development and maintenance.

To achieve these aims, this dissertation first establishes common concerns in the CCRC built environment and resident satisfaction by conducting a systematic review of archival data across three sectors from the perspectives of state rules and regulations, facility guidelines, and literature [Study 1], exploring the current considerations for the built environment and supportive services of CCRCs. In response to [Study 1], this is followed by overlaying the disparate perspectives of finance and design in the CCRC development and operation to suggest beneficial

built environments and supportive services of CCRCs for financially healthy development and operation [Study 2]. Finally, by limiting to have the same location and supportive services, design strategies for the built environment are indicated and linked to support the CCRC fiscal stability [Study 3]. Overall, this project proposes a set of criteria to inform CCRC development and operation to support CCRC stakeholders including design practitioners, the practitioners' clients, and the residents of future CCRCs.

Study Significance

This study explores the question of how the design practitioners can pursue and deliver increased CCRC stakeholders' satisfaction, across the levels of developer, designers, and residents, through the design of the built environment and supportive services. By incorporating perspectives from design and finance, this research seeks to suggest additional much-needed guidance for CCRC development and operation. If design practitioners use these evidence-based results to make more informed decisions about the design of their CCRC projects, they will provide both greater service to their clients and industries, as well as contribute to increased social responsibility toward the CCRC residents.

As a result, the research will play a role as a facilitator in developing and operating CCRCs to support happier and healthier residents, better business for CCRC owners, and a greater appreciation of the value of well-designed built environments. Furthermore, if the more desirable CCRC built environments influence the senior living market, CCRC owners will consistently develop and design more supportive CCRCs for seniors. By supporting a designer's practice by helping to fulfill professional service through social and ethical responsibilities to higher-risk populations, this research will contribute to meaningful knowledge creation and address gaps in the literature around these relationships between CCRC stakeholders. Subsequent

research should be continuously built upon this analysis and proposal and should be shared with students majoring in design disciplines, for continuous improvement in CCRC facilities. As such, this research will also mitigate a gap between design practice and the education of future designers by applying research findings to design projects through easily understandable and applicable references to design projects. Fundamentally, this study is intended to increase the CCRC resident satisfaction for seniors directly, as well as indirectly to other stakeholders in the CCRC industry.

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CHAPTER 2: Article 1

Synthesizing Common Concerns in Rules and Regulations, Guidelines, and Research for Built Environments in Continuing Care Retirement Communities

This paper reviews overlapping concerns in governmental, professional, and academic efforts to support residents in Continuing Care Retirement Communities (CCRC). I conducted a systematic review of priorities across these three sectors from the perspectives of state rules and regulations, facility guidelines, and research literature. Findings indicate that: 1) keeping the operation continuous without bankruptcy of CCRCs and 2) development of a sense of community are common issues across sectors that considerably supports resident satisfaction. This paper outlines a research gap and suggests a CCRC development and maintenance guideline would be useful to address these issues in CCRC development and maintenance projects.

Keywords: CCRC; continuing care retirement community; resident satisfaction; CCRC built environment; occupant satisfaction

Introduction

Many stakeholders such as state governments, design and development organizations, and researchers are interested in improving the built environment of Continuing Care Retirement Communities (CCRC). Even though these different efforts all address the common purpose of “mak(ing)... a better built environment for residents” (Bartuska, 2007, pp. 9-11), the different entities still work to address their specific concerns, without overarching integration to align with

other interested disciplines. This paper explores rules and regulations of state governments, CCRC facility guidelines, and research articles about supporting residents in U.S. CCRCs, with the aim of outlining focus areas of each sector: government, practice, and the academy and to discover if there are gaps in coverage. These outlined focus areas are then synthesized to establish a set of common issues to direct subsequent research towards creating a new CCRC development and maintenance guideline.

Focusing on the CCRC environment is significant because the CCRC 1) has been the leader among senior living residence types and 2) accounts for almost half of the U.S. retirement community industry (Curran, 2018, p.15). However, there is no U.S. federal regulation (U.S. Government Accountability Office, 2010, p.34) or any uniform facility guideline (Facility Guideline Institute, 2018) that specializes in CCRCs. Despite the fact that CCRC facilities are continuously being developed (Peck, 2018), there are currently no guidelines for new CCRC development that address rules and regulations, promising practices for facilities and supportive services, and resident satisfaction. This paper aims to provide CCRC stakeholders engaged in designing and building CCRCs with additional insight on methods to provide greater service to their clients and increase resident satisfaction.

Literature Review

This paper explores different perspectives on CCRC design and development. First, the emergence of CCRCs in the U.S. senior living industry is outlined. Second, I identify issues in resident satisfaction with CCRC built environments. Then, literature is reviewed to identify resources from governments, practitioners, and researchers on CCRC built environments.

Ultimately, gaps are outlined in both the academic literature and professional resources within the design and development processes of CCRCs.

Emerging Continuing Care Retirement Communities

The retirement community industry began around the 1920s and 1930s (Weisman, 1999) to help support seniors' well-being consistently as their health conditions change. Types of retirement communities traditionally included independent living, assisted living, and nursing homes, which each functioned as differentiated retirement community models supporting one type of lifestyle (Holzhey, 2017, p.3). In other words, if seniors needed to change their type of retirement community, they likely needed to move to another community. Because seniors often struggle in daily activities due to the steady decline of their health, a new approach to supportive senior housing was needed that strategically emphasized continuous resident living with adaptability and satisfaction (Sanders, 1997, p.3). As such, the CCRC structure appeared in the market around the 1960s and 1970s (Zarem, 2010, p.7). According to the American Association of Homes for the Aging (Gurney, 2011), the CCRC is defined as “an organization that offers a full range of housing, residential services, and healthcare in order to serve its older residents as their needs changes over time” (Sanders, 1997, p.3).

In the U.S., CCRCs offer a full range of care services in one place (Zarem, 2010, p.4) and are the most prevalent retirement communities in the industry holding 49.7% of the market (Curran, 2018, p.15). Demand for CCRCs currently exceeds the supply, even though CCRCs have been built at an increasingly steady rate since the 1980s (Sanders, 1997, p.28). The U.S. CCRC numbers have increased by 144% from 800 in 1990 (Netting & Wilson, 1991, p.267) to 1,955 in 2017 (Ziegler, 2018, p.1). The owner and operator Brookdale Senior Living holds the largest portion of the senior living market nationally with 7.6% of the market (Curran, 2017, p.27) consisting of 102,055 units operated (American Seniors Housing Association, 2017, p.10). As shown in Figure 2.1, given Brookdale's numbers, the estimated total CCRC inventory

nationally is 667,386 units, assuming market segmentation is proportional to the number of units operated; in 2017, there were 50,812,192 seniors (people older than 65), or 15.6% of the total population (325,719,178) (U.S. Census, 2017). CCRC facilities only housed 1.3% of the senior population in 2017. Given this calculated supply and demand in the senior living market, as well as established senior preferences for CCRCs (Groger & Kinney, 2007, p.98), it can be assumed that the CCRC format will continue to lead the senior living market.

$$\begin{array}{ccccccc}
 \mathbf{102,055} & \doteq & \mathbf{667,386} & \div & \mathbf{50,812,192} & \doteq & \mathbf{Only\ 1.3\% \ of} \\
 \mathbf{residential\ units} & & \mathbf{residential\ units} & & \mathbf{Seniors} & & \mathbf{each\ senior\ can\ occupy} \\
 \mathbf{in\ 7.6\% \ of\ Senior} & & \mathbf{in\ 100\% \ of\ CCRCs} & & \mathbf{In\ 2017} & & \mathbf{a\ CCRC\ residential\ unit} \\
 \mathbf{Living\ Facilities} & & & & & &
 \end{array}$$

Figure 2.1. CCRC Residential Unit Inventories Compared to the U.S. Senior Population in 2017

Resident Satisfaction in CCRCs

The CCRC is a type of senior living environment that provides supportive services for its residents so they may stay in one facility as their needs change (Zarem, 2010, p.4). Ensuring resident satisfaction in the context of their changing needs requires attention to the built environment. The built environment is “Everything humanly made, arranged, or maintained to fulfill human purposes and mediate the overall environment with results that affect the environmental context” (Bartuska, 2007, p.5). The built environment supports a variety of physiological needs such as ensuring survival (shelter, economics, technology, etc.), supporting relationships (kinship, marriage, etc.), and forming a society (shelter, territoriality, medical, police and fire protection, etc.). The built environment also satisfies psychological and social needs, from conserving society (ethics and community concepts) to individual freedom (responsibilities, education, and arts) (p.9). Because it has evolved to address a variety of purposes, the built environment has also been researched through many lenses in many

disciplines (Glanz et al., 2016), but ultimately these lenses are aligned with the unified goal of satisfying human needs.

In the case of residential facilities, when the built environment succeeds in satisfying these physiological and psychological needs, it reaches higher levels of resident (consumer) satisfaction (Kotler & Keller, 2011, p.53). Resident satisfaction in built environment research has traditionally focused on various perspectives such as indoor environmental qualities (Abbaszadeh, Zagreus, Lehrer, & Huizenga, 2006; Frontczak et al., 2012), privacy (Kim & de Dear, 2013; Melorose, Perroy, & Careas, 2015), and health (Peretti & Schiavon, 2011; Urban Land Institute, 2013). Though there are many findings through different research lenses, a common theme is that resident satisfaction across built environments attempts to be measured in direct relationship to the needs of residents. In terms of psychological well-being, seniors prioritize considerations in order of: 1) autonomy, by living independently; 2) positive social relationships, 3) environmental mastery without much physical support, 4) self-acceptance of current status, 5) purpose in life, and 6) continued personal growth for their psychological well-being (Ryff & Keyes, 1995, p.722). These considerations can be tied back to affordances of the built environment. For example, the built environment sets a degree of privacy between autonomy for living independently and social relationship. This concept illustrates how seniors can achieve higher levels of psychological well-being when their physiological needs are satisfied with the help of the built environment. In other words, CCRCs can achieve higher levels of overall resident satisfaction by supporting their residents physically and psychologically through physiological building elements.

Gaps in Research for CCRC Facilities and Services

As outlined earlier, the built environment has been largely designed with the intent of satisfying human needs. As such, CCRC built environment research has therefore focused largely on exploring strategies to satisfy human needs. CCRC residents often stay in their CCRC through the end of their lives. According to a study “Where Do CCRC Residents Die?” looking at CCRC data in North Carolina over eleven years, 70% of CCRC residents passed away at their CCRC campus; additionally, 26.4% of CCRC residents passed away 8.9 days on average after transferring to a medical center linked to their CCRC; these factors mean 96.4% of CCRC residents spent the final part of their lives in the CCRC (Galanos, Hays, Moore, & Poppe, 2004, p.1402). Even though no CCRC guarantees care for residents until death, many residents choose to stay at the CCRC for the duration of their lives if possible. To achieve resident satisfaction in CCRCs, facilities and supportive services, therefore, must be designed to provide continuing care despite often dramatic changing health conditions immediately prior to death. Therefore, the built environment and resident satisfaction should be studied and evaluated across the levels of care provided in CCRC facilities.

Literature on CCRC Built Environments and Resident Satisfaction

There is limited literature on resident satisfaction in CCRC built environments. Park and Rider (2017) previously outlined the current status of senior living research. Based on the scholarship database of the Association of Collegiate Schools of Architecture (ACSA), twenty-six scholars had categorized their research interests under the category of “Health + Age.” These scholars’ affiliations and co-workers who were in the scholars’ affiliations were explored to expand the list of researchers in academia addressing the health + age theme, culminating in a total of 80 scholars. From these 80 scholars, titles of their research publications were gathered from 41

C.V.s available from program websites, totaling 4,921 research publications. From this sample, CCRC-related research articles numbered less than twenty, and none addressed resident satisfaction in the CCRC built environment. Furthermore, from the ScienceDirect database, one of the leading platforms of peer-reviewed scholarly literature, only thirty articles were found with the keyword “CCRC resident satisfaction,” and only one of those thirty addresses resident satisfaction as it relates to a CCRC’s physiological and psychological factors (Palmer, Howard, Bryan, & Mitchell, 2018). Others address isolated factors focusing on residents’ condition (Wrights et al., 2015), environmental (Arman, Zuo, Wilson, Zillante, & Pullen, 2009), or management issues in CCRCs (Ewen, Nikzad-Terhune, & Chahal, 2016).

Rules and Regulations on CCRC Built Environment and Resident Satisfaction

Regulations for CCRC services and facilities are typically established by each state (U.S. Government Accountability Office, 2010, p.34). In other words, there is no comprehensive regulation for CCRCs at the federal level addressing facilities and supportive services. Furthermore, there are several states without any rules and regulations pertaining to CCRCs (United States Government Accountability Office, 2010, p.17). The absence of federal regulations for CCRCs places CCRC residents in these particular states in a position where they are not protected by law. For example, if a CCRC in the state goes bankrupt, no one knows what measures can be provided to residents of the CCRC, but other states with CCRC licensing regulations review their CCRCs’ operation and maintenance regularly to support the continuing operation of the CCRCs. It is, therefore, necessary to research the current rules and regulations for CCRCs, aiming to increase opportunities supporting federal law enactment for CCRC residents. There is an exemplary case with consequences after researching current rules and regulations for an assisted living; Carder, O’Keeffe, and O’Keeffe (2015) synthesized assisted

living regulations and policies of each state; the synthesis identified not only the current status but also gaps in rules and regulations for the assisted living; as a result, governors, practitioners (Gose, 2016), and researchers (Carder, O’Keeffe, O’Keeffe, White, & Wiener, 2016) have been able to move further for better assisted living built environment by referencing the synthesis.

Guidelines on CCRC Built Environment and Resident Satisfaction

Since the American Institute of Architects (AIA)’s Committee on Architecture for Health reviewed the 1983-84 edition of Guidelines for Construction and Equipment of Hospital and Medical Facilities published by the U.S. federal government and the revision in 1987, the guidelines have existed in the private sector (Facility Guidelines Institute, n.d.). From 2001, the Facility Guideline Institute (FGI) has guided health care facility development through their “Guidelines for Design and Construction of Residential Health, Care, and Support Facilities” (Facility Guideline Institute, 2018). The newest version of FGI guidelines index four types of senior living facilities: independent living, assisted living, nursing homes, and other individual care levels. Yet there is no comprehensive reference for the CCRC built environment in terms of facility guidelines. As a result, new CCRC developments do not have a clear manual for either their built environments or services.

Literature Synthesis

As the leading trend in senior living facilities, the CCRC aims to meet the psychological and physiological resident needs to increase resident satisfaction through the last period of their lives. This literature review establishes a need for uniting research around CCRC built environments to address both facilities and supportive services. Specifically, the need exists to accurately create a

roadmap of the current governmental, professional, and academic resources to allow for the betterment of these facilities as they continue to be built.

Conceptual Framework and Research Questions

This paper aims to inform the design of new CCRC developments by establishing a baseline for a comprehensive reference guideline for designing facilities and services, with the goal of increasing satisfaction for CCRC residents. As outlined, there is limited literature identifying and synthesizing the current state of resources from governments, practice, and research addressing the design of CCRC facilities. Therefore, this paper begins by synthesizing theories from current resources across these disciplines.

Theoretical Perspective

Chynoweth (2009) concludes that the built environment is a multidisciplinary subject area and that the built environment must be viewed as such to identify practical benefits for different decision makers. In response to this need for a comprehensive perspective, multiple disciplines can be integrated to establish a new way of understanding the CCRC environment. Pound and Campbell (2015) used a method to synthesize theories related to risk-taking issues in health; their theory synthesis process is rooted in an evidence-based design to maximize health outcomes. The resulting understanding increases opportunities for maximizing outcomes in the field by incorporating once separate multi-disciplinary approaches. This methodology can be transferred to address different approaches in CCRC design and operation.

By recognizing both the need and feasibility of this type of synthesis, this paper uses Pound and Campbell's (2015) perspective of theory synthesis to incorporate governmental, professional, and academic efforts addressing CCRC development. By emulating this process,

this paper increases opportunities for enhancing resident satisfaction in CCRCs by further engaging and informing design practitioners in their design processes.

Conceptual Framework

Roy, Dubé, Després, Freitas, and Légaré (2018) identified factors influencing seniors' decision making around housing selection through a systematic literature review. After recognizing a lack of relevant data addressing senior housing selection, the authors collected literature related to housing decisions for seniors with a set of keywords and through select research portals. The team executed a qualitative thematic analysis of the collected literature, resulting in factors found to influence seniors when selecting housing.

Through this systematic review framework, this paper: 1) collects documentation through a set of keywords in relevant archives which address the three sectors of government, professional practice, and academia, 2) analyzes the collected documents to establish the current outcomes and working understandings, 3) identifies specific issues across these efforts to increase resident satisfaction in CCRC built environments, and 4) synthesizes specific elements to direct future research toward establishing an integrated reference for future CCRC development.

Study Methodology

Research Design

In addition to reviewing literature, this paper also conducts a systematic archive review of rules and regulations, facility guidelines, and research outcomes to identify supportive efforts to CCRC residents in terms of CCRC built environments, then synthesizes these elements in an

attempt to maximize efficiencies of the efforts across sectors. As a first step, to establish the selection pool for governmental, professional, and academic efforts, this study uses 1) directories of regulatory departments related specifically to CCRCs (U.S. Government Accountability Office, 2010, p.17) and general State Legislatures, Laws, and Regulations (McKinney, 2018); 2) AIA's senior living data (AIA KnowledgeNet, n.d.); and 3) the research portal "Taylor & Francis Online". Second, data is taken from both governmental and professional archives with the keyword "continuing care retirement" and from research articles with keywords "CCRC resident satisfaction" and "CCRC occupant satisfaction." Third, the collected archives and articles are synthesized to identify relationships between elements of the CCRC built environments and resident satisfaction. Fourth, through a synthesis process, a theoretical relationship between the identified elements of CCRC built environments and resident satisfaction is proposed. Ultimately, this article establishes an evidence-base for identifying elements of CCRC built environments that contribute to increasing resident satisfaction.

Research Samples

This research uses three research sample archives. First, governmental efforts addressing the CCRC building type are reviewed through homepages of state governments; a report on Aging in the U.S. (U.S. Government Accountability Office, 2010, p.17) identified state governmental departments for CCRCs; Law Librarians' Society of Washington, D.C (McKinney, 2018) listed legislation departments of state governments. Second, professional practice efforts in CCRC development are gathered the American Institute of Architects (AIA) "Design for Aging" (AIA KnowledgeNet, n.d.) publications through AIA's online database, which supports and educates design practitioners. The publications are shared by the AIA to provide an evidence-base for professional efforts and to help to improve the built environment and quality of life for seniors.

Third, academic efforts addressing CCRC environments are selected through the research portal “Taylor & Francis Online.” Because there is only one article (Palmer et al., 2018) addressed CCRC resident satisfaction in ScienceDirect database with keywords “CCRC resident satisfaction,” used specifically to include considerations of both the CCRC built environment and resident satisfaction. Moreover, there is no found research article with the keywords “CCRC occupant satisfaction.” Because of this, the research portal was changed to Taylor & Francis Online, which includes the “Journal of Housing for the Elderly,” specializing in senior housing research.

Data Collection

Governmental Efforts for the CCRC

CCRC-specific rules and regulations were collected from each state website identified by the Law Librarians' Society of Washington, D.C (LLSDC) (McKinney, 2018). The LLSDC has an organized index of departments for rules and regulations per state government on its website. By visiting every link to each state’s legislation department websites provided on the organization, this study collected laws, codes, statutes, and regulations (M. L. Cohen & Berring, 1989, p.214) of any entries including the terms “continuing care retirement community” or “continuing care retirement communities.” As a result, rules and regulations were identified from fifty states and Washington DC.

Professional

For this research, we reviewed every online publication in the AIA’s Design for Aging database. Results included Design for Aging Review reports and Post Occupancy Evaluation resources

including books such as “Design for Aging Post-Occupancy Evaluations.” In the case of books which are not available online, the printed book was obtained through the North Carolina University library system for review.

Academic Efforts

By using the research portal “Taylor & Francis Online” using keywords “CCRC resident satisfaction” and “CCRC occupant satisfaction,” thirty-seven articles were collected that were only accessible through North Carolina State University’s library system.

Data Synthesis

All collected rules and regulations, articles, and reports were reviewed to thematically identify efforts addressing CCRC residents rather than issues geared toward CCRC owners. For example, “Nonforfeiture benefits” addresses CCRC owners directly and therefore was excluded from identified efforts even though it has the term “Continuing Care Retirement Community.” The identified efforts were then classified as facility-related or supportive service-related. Emergent sub-classifications included: 1) configurations of facilities, and 2) quality control of supportive services. Based on these classifications, the classified efforts from government, practice, and academy were examined to identify common issues of them.

Findings

Governmental Efforts

Among the fifty states and Washington DC, thirty of them have supportive rules and regulations in place for CCRC residents that include the term “continuing care retirement community” or “continuing care retirement communities” (Table 2.1). Beyond the states listed in Table 2.1, four

additional states (Florida, Massachusetts, Nevada, and New Hampshire) support CCRC facilities with rules and regulations including the term “Continuing Care”; but these four states are excluded in this research because 1) they do not use the specific term “continuing care retirement community” or “continuing care retirement communities” and 2) the term “Continuing Care” is not specified for senior living facilities.

Twenty-seven of the thirty have defined the term CCRC with specific ranges of required supportive services through their rules and regulations; some of them specify the required facilities, additionally; those definitions set minimum standards for the CCRC built environment. Consequently, these definitions provide guidance for residents’ health condition changes by designating required levels of care units; for example, five states (California, Colorado, Georgia, Michigan, New Jersey, Ohio) and DC require CCRCs to have three different stages of facilities such as independent living, assisted living, and nursing home.

Nine states have rules and regulations addressing amenities or residential units. For example, Georgia specifies required amenities dedicated to resident health and wellness in CCRCs including: 1) indoor amenities such as rooms for games, events and socializing; 2) open air facilities protected by a roof such as bocce courts (clay style) and shuffleboard courts; and 3) outdoor amenities such as lawn sports, golf course, croquet courts, etc.

In one case, Arizona requires a certain number of residential units in total at any level of independent and assisted livings, which must be more than twice the number of nursing home residential units in a CCRC. On the other hand, Maryland limits accepting new residents to nursing home residential units in a CCRC when the occupancy rate of the nursing home is over 95%. The limitation aims to support continuing care to existing residents as their health condition changes, when they may need to move to the higher level of care.

Table 2.1.State Rules and Regulations for the CCRC Residents

State	Reference of Rules and Regulations	Definition	Facility	Service
Arizona	Revised Statutes 36-2999.51.	o	Unit Configuration	
California	Code HSC 1324.20.	o		
	Code HSC 1771.			Service Guarantee
	Code HSC 1771.7.			Self-determination
	Code HSC 1771.8.			Community
Colorado	Revised Statutes 25.5-6-203.	o		
Connecticut	Public Act No. 15-115.	o		Service Guarantee
	Sec. 17b-523a.			Resident Rights
Delaware	Code Title 30, Ch 65.	o	Unit Configuration	
DC	Code Title 44, Ch 1A., §44-151.	o		Service Guarantee
Georgia	Code 134-202.1.	o	Facility Guideline for CCRC	
	Code 31-6-2	o		
	Code 31-6-47			Quality control
Hawaii	Code 346F-3	o	Unit Configuration	
Indiana	IC 16-28-15-2	o	Unit Configuration	
Iowa	Title 13, Sub-title 1, Ch 523D.1	o		
Maine	Title 24-A M.R.S.A. Ch 73.	o	Unit Configuration	
Maryland	Code 32.02.01.	o		
	Code 10.24.01.03		Unit Configuration	
	Annotated Code 19-124		Unit Configuration	
Massachusetts	Session Laws Acts (2012) Ch 419			Community
Michigan	Code Act 368 of 1978 333.20161	o		
Minnesota	Code 19.25.45	o		
Nebraska	ICF/MR-NF ACTS 405 NAC 2-001	o		
	Revised Statute 68-1904	o		
New Jersey	Annotated Code 5:19	o		
	Annotated Code 8:33H-1.2	o		
	Annotated Code 7:50-2.11	o	Unit Configuration	
New York	General Municipal Law 854	o		
	Public Health Law 4601	o		
	Public Health Law 4612			Community
	Public Health Law 4624			Service Guarantee
North Carolina	N.C.G.S. 58-64	o		
Ohio	Code 5160:1-6-02.3	o		
Oregon	Act. Ch 411, Division 67	o		
	Law Title 10, Ch 101.	o		
Pennsylvania	Title 47, 1-102.	o		
South Carolina	Section 37-11-20	o		
	Title 37, Ch 11	o		
	Ch 61, Section 77	o		Service Guarantee
South Dakota	Codified Law Ch 34-12-42	o		
Tennessee	Code 71-5-1001.	o		Service Guarantee
Texas	Administrative Code Title 28, Part 1, Ch. 33.2	o		Service Guarantee
Vermont	Status 8002	o		Service Guarantee
Virginia	Code 32.1-102.3:1.1.			Financial Support
	Code 32.1-102.3:2.	o	Unit configuration	
	Code 38.2-4900			Service Guarantee
Washington	Revised Code Title 18, Ch 18.390	o		
Wisconsin	Status 16.009			Insurance
	Status 146.91			Insurance

Regarding services provided in CCRCs, nine of the thirty states with CCRC regulations in place guarantee the continuing care service in CCRCs to residents as long as CCRCs are operational under their licensure regulations; four of the thirty encourage resident groups or resident representatives to participate in CCRC management to advocate for resident rights; and two of the thirty have state-funded financial aid programs for nursing home residents' monthly fees and CCRC owners' CCRC operation.

Professional Efforts

The AIA's Design for Aging homepage hosts a Design for Aging Review report series and a book titled "Design for Aging Post-Occupancy Evaluations." The reports describe insights and innovative knowledge from senior living facility development projects, including CCRC cases. The book reports results of post-occupancy evaluations (POEs) from six CCRC centers in the U.S. These publications include results of reviewing CCRCs, which has been built or are going to be built, especially in terms of CCRC built environmental elements.

According to the latest report, "Design for Aging Review 14" (AIA, 2018, pp.174-203), senior living projects are trying to provide holistic wellness (physical, social, intellectual, emotional, spiritual, vocational, and environmental) to residents through both facilities and programs. Also, efforts to increase resident satisfaction include promoting a sense of community, connecting to the greater community, amenities, proximity to nature, and a collaborative design process with designers and stakeholders. Given these considerations, new projects tend to be in urban and suburban areas rather than rural area (p.177). This location strategy aligns with recent research addressing the U.S. seniors' residential preferences (Kwon, Lee, & Beamish, 2016, p.259), which claims that one of the seniors' housing preferences is the city townhouse,

considering their finances and engaged lifestyles. While the location strategy focuses on urban and suburban areas, senior living projects have reduced their investments per individual residential unit, except for assisted living units (AIA, 2018, p.179). On the other hand, the senior living projects have tended to expand community amenities of fitness, wellness, learning, activity, dining and outdoor areas (pp.185-186). Additionally, recent projects have targeted connecting to communities surrounding the CCRC and promoting a sense of community through public spaces within their projects (pp.194-196).

Table 2.2. POE results of CCRCs only in terms of resident satisfaction

CCRC	Objective	Design Intent	Observation	Other comments
A	Satisfying both independent living and assisted living residents	Separated entrances for each resident group	Each group residents are separated environmentally and socially	<ul style="list-style-type: none"> Urban, vertically oriented, single-structured facility Integrate the CCRC and retail spaces Physical and psychological separation between independent living and assisted living Urban mood with comfortable living quality Issue for zoning with pathway Issues for community and physical design in terms of services
B	Identifying each level of care	Entrances, parking, and common areas for each building	Little socialization because of the separation	<ul style="list-style-type: none"> Operating a voluntary program which independent living residents support assisted living residents partially to encourage community belongings Issue for engagement between new and long-standing residents in assisted living. Issue for lack of sunlight and open spaces for operators and nursing home
	Aging in place option for independent living residents	Enhancing accessibilities for wheelchair and golf cart	Issue for having not a strong philosophy and history of aging in place	
C	Connection to outdoor environment	Providing sun-filled terraces at each floor and elevators per specific area	Issue for efficiency of service providers	<ul style="list-style-type: none"> High-rise CCRC facility Effective for community building Adequate facilities for quality of life Issue from the transition of management
D	-	-	-	<ul style="list-style-type: none"> Issue for disconnection between independent living and assisted living residents, but actively socialized at each level of care Cultivating community interaction inside and outside of dining areas
E	Every seven nursing home residents are cared by one staff	Support the staff's efficiency by floor layout	After 7 years of operation, the layout was judged to be inefficient.	<ul style="list-style-type: none"> Having the reputation for excellence in the quality of life care Stabilized occupancy rate around 95% Secured benefits of outdoor environment not only from location but also from open space in site area Aged facilities and inefficient paths for service operators
	Separate spaces for 1) independent living residents and 2) assisted living and nursing home residents	Provide proper supportive entrances and pathways at each level of care	Separated entrances led to inequalities in space	

Setting aside issues of aesthetics, CCRCs are designed to provide proper and continuing services for each level of care provided. After occupancy, the CCRCs have been evaluated by comparing initial expectations with the actual use of the designed elements. Through these evaluations and assessment processes, professionals have tried to inform future CCRC developments and detect unexpected issues. In the *Design for Aging* book, there are five POEs including considerations such as (design) objective, design intent, and field observation results of each CCRC center (Table 2.2). By reviewing the POEs through the specific lens of resident satisfaction, the two major issues found are 1) the lack of a sense of community 2) inefficiency of service operation in the CCRCs. Objectives of CCRC built environments for providing appropriate services to residents have resulted in separated residents (CCRC A, B, D, and E) and inefficient operation (CCRC A, C, and E).

Academic Efforts

Seventeen articles (Table 2.3) focused on or related to CCRC resident satisfaction were identified by reading and analyzing thirty-seven collected articles from Taylor and Francis as outlined earlier. The identified articles show that major issues in retirement communities change over time. Articles in the 1980s tended to focus on specific issues supporting continuing care and living for residents in CCRCs, such as solving financial problems of CCRC operation (Pynoos, 1985) and case study of CCRC management for the continuity of CCRC operation (Elliott & Elliott, 1986). In the 1990s, topics focused on illustrating the attractive aspects of CCRC to residents, such as providing continuing care as residents are getting older (Lucksinger, 1994). Since 2000, researchers have primarily explored seniors' housing needs and preferences, aiming to increase resident satisfaction.

Table 2.3. CCRC Residents-Related Content and Issues from Literature

Author (Year)	Content related to CCRC residents	Issue
Pynoos (1985)	Reviewing a book about empirical, financial, and legal analyses of CCRCs to solve financial problems of CCRC operation	Support to continuity of CCRC operation for providing continuing care and living to residents
Hunt & Hunt (1986)	Making a comparison between Naturally Occurring Retirement Communities and CCRCs	CCRC residents have not only health care but also lifestyle benefits
Williams (1986)	With definition of CCRC, this research analyses the current status and prospects the future of CCRCs. Additionally, the author insists the need for CCRC regulations	Support to continuity of CCRC operation for providing continuing care and living to residents
Sambol, Duncan, & Katz (1986)	Describing current status of CCRCs in the state of New York in terms of program and operation	Support to continuity of CCRC operation for providing continuing care and living to residents
Elliott & Elliott (1986)	Studying a case of CCRC over 9 years of operation addressing how to evolve CCRC management	Support to continuity of CCRC operation for providing continuing care and living to residents
Belcher (1987)	Reviewing a book addressing how to protect CCRC residents from the financial risk of CCRCs	Support to continuity of CCRC operation for providing continuing care and living to residents
Parr, Green, & Behncke (1989)	Informing CCRC developers of CCRC marketability study outcomes including prospective residents, their preferences, and their evaluations on CCRCs after occupation.	Support to continuity of CCRC operation for providing continuing care and living to residents
Gonyea, Hudson, & Seltzer (1991)	Exploring senior housing preference in different types of senior living facilities; CCRC is the most preferred type if they need to leave their current housing	Senior preference to living in CCRCs
Higgins (1993)	Reporting legal and financial issues on CCRCs including residents' and owners' perspectives	Satisfying residents and owners for sustainable CCRC operation legally and financially
Lucksinger (1994)	Illustrating the suitability of CCRC's Aging in Place concept implementation	Life care in CCRC
Pastalan & Schwarz (1994)	Referencing four reasons for being attracted to CCRCs and describing that independent living residents prefer not to mingle with nursing home residents since they don't feel like living in a hospital (p.172)	Attractive points of CCRCs to residents and need for separation of residents
Sheehan & Karasik (1995)	Identifying reasons for choosing CCRCs such as guaranteed health care and supportive services.	Require to plan and manage services for the independence of residents.
Groger & Kinney (2007)	Analyzing reasons for moving to CCRCs	Understanding needs of CCRC residents for increased satisfaction
Kennedy & Coates (2008)	Identifying types of resident satisfaction in retirement communities: 1) built environment, 2) financial environment, 3) forward planning, 4) service delivery environment, 5) social environment, and 6) spiritual environment	Understanding needs of CCRC residents for increased satisfaction
Kwon et al. (2016)	Exploring the changing lifestyle and residential preferences for seniors	Understanding needs of CCRC residents for increased satisfaction
Francis, Rikard, Cotten, & Kadylak (2017)	Concluding that the information and communication technology can enhance the wellness of seniors by communicating each other.	Supporting residents' wellness
Yuan, Hanrahan, Rosson, & Carroll (2018)	Identifying the advantages of coproduction activities for healthy aging	Enhancing community-based activities for resident health

Common Issues for the CCRC across Efforts

The three different sectors – governmental, professional, and academic - fundamentally all aim to support continuing operation of CCRCs in providing continuing care and living for CCRC residents. This is done by 1) supporting CCRC management with rules and regulations, 2) improving the performance of facility layouts and supportive services in practice, and 3)

investigating theoretical and practical cases of CCRC management through academic, peer-reviewed research. The existence and continued operation of the CCRC model provide opportunities for aging residents, including both healthcare and aging in place.

The next commonality between the three sectors is the sense of community. California, Connecticut, Massachusetts, and New York have supportive regulations to encourage residents' participation in their CCRC management; in order to improve CCRC operation by reflecting residents' needs; for the effectiveness and efficiency of the improvement, it is necessary to synthesize opinions of community through the sense of community. In practice, several POEs reported a lack of sense of community between residents in different care levels; the POEs analyzed the reason for this lack of community as due to the provision of appropriate facilities at different levels of care. However, there is another interpretation in the academy. Lucksinger (1994) warned that the stigma of CCRC residents closer to the end of their lives could weaken the sense of community. Additionally, Pastalan and Schwarz (1994) suggest that a more able-bodied resident may not want to mingle with less-able residents in continuing care facilities because independent residents may not want to feel as though they are living in a hospital. Consequently, the second common issue is the necessity of understanding how to enhance the sense of community and resident satisfaction.

Conclusion and Discussion

According to the rules and regulations for licensed CCRCs (Table 2.1), the CCRC built environment consists of facilities and supportive services to provide continuing care for residents. These rules and regulations include definitions of CCRCs to outline legally support ranges, facility guidance, and required services. Additionally, some states promote creating a sense of community to help in providing appropriate services and protecting residents' rights.

According to AIA's publications, CCRC stakeholders can collaborate with each other to ensure the stakeholders' needs by exploring the design and implementation process. As a result, the AIA publications identified issues addressing 1) enhancing CCRC competitiveness through location selection, facilities, and supportive services, and 2) improving a sense of community and efficiency of provided services by considering facility layouts and service configurations. Lastly, researchers who are interested in CCRC built environments have studied various perspectives on phenomena related to CCRCs. Their research interests have shifted over time from issues addressing 1) supporting continuing operation of CCRCs for continuing care and living for residents to 2) residents' needs and working toward higher levels of satisfaction.

By synthesizing the diverse efforts from different sectors for supporting resident satisfaction in CCRCs, this research establishes two aligned themes: 1) supporting the continuity of CCRC operation to provide continuing care for residents and 2) developing a sense of community between residents. Supporting the continuity of CCRC operation is necessary to achieve continuing care for residents. This continuing operation requires financial stability for licensed CCRCs, and thereby required satisfied residents who will continue to stay at the center as well as recommend the center. The sense of community is important to provide appropriate service to residents by synthesizing their opinions, delivering the synthesized opinions, then reflecting the opinions to their CCRC operation; it has been supported by facilities and services in CCRCs and has also been researched by POEs.

While new CCRCs have been continuously developing without a comprehensive guideline for CCRC built environments, the outlined two aligned themes require further study. Because research outcomes on these themes will guide the new CCRC development and existing CCRC maintenance aiming to increased resident satisfaction. In terms of the CCRC built

environment, addressing how to achieve the continuity of CCRC operation will 1) guide developers to develop CCRCs that stable financially then 2) increase the opportunity for CCRC continuing operation which can provide continuing care and living for residents. Addressing the relationship between the sense of community and the CCRC built environment should also guide new CCRC developments aiming to increased resident satisfaction. For future research to establish a guideline for CCRC developments addressing both issues, it is necessary to investigate what characteristics of CCRC built environment support continuing CCRC operation and the sense of community.

The major limitation of this study is the ranges of archives in each sector. For example, this research reviewed all rules and regulations except for court cases addressing how the rules and regulations have been applied in the real world. Prior to reviewing how the rules and regulations are applied, this research remains at the theoretical level. Also, in the professional and academy sectors, this research reviewed only published guidelines and literature in specific archives. There may be exemplary CCRC facilities and services which have not been studied and published but widely applied in practice or meaningful research on the CCRC resident satisfaction outside of Taylor & Francis and ScienceDirect. For reliability, however, data were collected for the selected keywords 1) “continuing care retirement community” and “continuing care retirement communities” in the database of state governments and 2) “CCRC resident satisfaction” and “CCRC occupant satisfaction” in the database of Taylor & Francis. In addition to the collected dataset, this research reviewed all materials in the AIA’s online database. In addition, the analyzed data are specified with the reference codes and page numbers from collected articles to address the process of conversions from the original contents to analyzed data. Given these specified process, this research can be replicated and findings confirmed.

Future research should seek to address the limited ranges of archives by expanding the ranges of archives, especially including precedents in practice.

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CHAPTER 3: Article 2

Exploring Relationships between Finance and Design in Continuing Care Retirement Communities in North Carolina: An Investigation of the Built Environment and Supportive Services

Continuing Care Retirement Communities (CCRCs) have been continuously developed and maintained through a host of challenging financial contexts. To address some of these difficulties, this study aims to better understand how differences in the built environment and supportive services across CCRCs may impact financial health. This paper systematically analyzes a small, purposeful sample of North Carolina CCRCs through governmental reports and current websites. In doing so, this research 1) outlines the CCRC development trends chronologically, 2) identifies characteristics of the built environment and supportive services of both financially healthy and unhealthy CCRCs since 2008, 3) detects characteristics of these built environments and supportive services in financially unhealthy CCRCs developed before 2008, and 4) compares the built environment and supportive services identified in 2) and 3) with the current CCRC development trend. Findings indicate that the current trends in North Carolina CCRC development include: a) locating centers in metropolitan areas, b) smaller initial community scale that expand after achieving stable occupancy rates, and c) communities centered on apartment-style units. Additionally, the data indicates that these CCRCs provide all levels of care including Independent Living, Assisted Living, Nursing Home, and Dementia care service, and provide supportive services specifically including swimming pools, spas, or saunas. Finally, successful CCRCs are inviting residents of the CCRC to be represented on the board of directors. Additionally, in the case of newly developed CCRCs within the last decade achieving desirable financial health, centers are aligned with current trends in terms of location, levels of care provided, and having resident board members, as opposed to other CCRCs with undesirable financial health. This exploration also suggests that CCRCs with unhealthy financial records developed before 2008 tend to differ from the trends in categories of location, provided levels of care, provided supportive services, and resident engagement in CCRC management.

Consequently, this research suggests that it is worth substantially reflecting on how the built environment and supportive services of CCRCs align with current trends to enhance the financial health of CCRC development and operation. Through these types of additional considerations of the built environment, CCRCs may have an increased opportunity to provide more effective and satisfying life-long care for their residents.

Keywords: CCRC; continuing care retirement community; CCRC built environment; development guideline; viability

Introduction

Continuing Care Retirement Communities (CCRCs) have received conflicting reviews; in some places CCRCs are called the leading trend in the retirement community industry (Curran, 2018, p. 15) while others claim that CCRCs are the least attractive senior living facility model for investors (Lynn & Wang, 2008, p. 47). Despite this disagreement, the CCRC model has grown in response to market demand from seniors who prefer to live in these types of environments (Gonyea, Hudson, & Seltzer, 1991). This research aims to explore and support the success of this challenging senior housing type by proposing foundational elements to establish a built environment and supportive services guideline for CCRCs by analyzing select data from CCRC facilities in North Carolina which is one of ten states having the most CCRCs (Zarem, 2010). This research explores differences of built environment criteria and supportive services between financially healthy and unhealthy CCRCs with the goal to better understand and mitigate some difficulties of CCRC development and maintenance (Lynn & Wang, 2008, p. 48), ultimately helping to make more CCRCs fiscally viable. As a result, a reference guide is suggested to help stakeholders strengthen the viability of their CCRCs.

Existing CCRC facilities are a source of rich information, particularly using a built environmental perspective. Because CCRCs have been developing at an increasing rate without much time for reflection and evaluation, there are no standard guidelines for CCRC facilities (Facility Guideline Institute, 2018) or federal rules and regulations addressing CCRCs (United States Government Accountability Office 2010, p. 34). As a result of this study, designers of CCRC facilities and their clients can compare possibilities for CCRCs plans and facilities in terms of both built environment criteria and supportive services. Through this, these practitioners can begin to use evidence-based design to improve their CCRCs' longevity, and therefore their financial health. Consequently, design practitioners can utilize and build upon this guide to provide both better service and final products to the CCRC owners and their residents.

Literature Review

Opposing Views on CCRCs

The CCRC concept has been seen as an interesting topic and has received various opinions since entering the senior living industry in the 1960s (Zarem, 2010, p. 7). The CCRC is regarded as an alternative long term care facility for seniors (Williams, 1986) by providing “*a full range of housing, residential services, and healthcare in order to serve its older residents as their needs change over time*” (American Association of Homes for the Aging, Ernst, & Young, 1989, p. 5). Unlike other facilities, which provide specific levels of care such as Independent Living, Assisted Living, and Nursing Home, CCRCs provide multiple levels of care aiming to provide life-long care to residents in one place (Zarem, 2010, p. 4).

Providing multi-levels of care, despite being the element that makes the CCRC format so attractive to residents, also causes difficulties in facility development and maintenance, resulting in challenges to the viability of CCRC facilities. The CCRC development process requires long

and complex considerations about a variety of financial aspects. For example, depending on the period of obtaining the CCRC service license by cofirming the legal requirement of state government, CCRC developments may take three to six years between planning and completion prior to opening; developers must be able to cover all costs incurred during this variable period (Lynn & Wang, 2008, p. 41). Even if the development has been occupied, the operation and maintenance phase needs to address unpredictable risks. These risks may include declining occupancy rates or cost increases for possibly new methods of care delivery in response to evolving senior needs (United States Government Accountability Office, 2010, p. 2). Given this uncertainty, a number of CCRC bankruptcies were seen in the 1980s (Sanders 1997, p. 20). Even though the annual bankruptcy rate of CCRCs is low across industries, the CCRC bankruptcy rate is higher than that of other senior living facility types (Conover & Sloan, 1995, p. 453). As a result, the CCRC has been perceived as a less attractive senior living facility type for investment because of the difficulties across the three areas of development, operation, and liquidity (Conover & Sloan, 1995, p. 453; Lynn & Wang, 2008, p. 47).

Despite financial apprehension, the CCRC has become a leading trend in the senior living industry (Hogan, 2014). According to *the IBIS World Industry Reports*, CCRCs reached 49.7% of the senior living market in 2017 (Curran, 2017, p. 15) from only 22% in 2014 (Curran, 2014, p. 4). By considering a supply and demand perspective in the market (Kotler & Keller, 2011), one reason for this increase in marketshare is likely seniors' preference to live in a CCRC format (Groger & Kinney, 2007), where they can transition through life phases in one facility, rather residing at another senior living facility type.

CCRC Quality of Life

Various motivations encourage seniors to relocate from their existing houses to environments designed specifically for their needs. These factors may include health changes for their spouse/partner or themselves, overwhelming home maintenance responsibilities, desire for peace of mind and security, children/family encouragement, a need for increased social interaction, availability of meals without needing to cook, and no longer being able to drive (Liepelt, 2016). In response to these potential motivations, one study asked CCRC residents what traits of CCRCs provide them as residents with greater levels of satisfaction. Responses included the availability of emergency (health) services, freedom to live their own lifestyle, security and safety of their apartment and grounds, and cleanliness of the facility and the quality of housekeeping services in general (Ejaz & Schur, 2003). This interview study (Ejaz & Schur, 2003) illustrates that the CCRC used as a subject in their research mostly addresses the needs of seniors established previously in the Liepelt (2016) survey study about concerns and motivations. This illustrates an alignment between resident needs and product delivered. Additionally, in a different study utilizing a mailed survey, the CCRC was found to be the most preferred senior housing option among seniors except for the option of remaining in their existing homes with access to supportive services (Gonyea et al., 1991, p. 91).

In addition to affordances and supportive services provided by the CCRC format, seniors also favor CCRCs because of the assured stability of the facility and services available throughout inevitable changes of residents' lives. Important structures and consistency include physical and social environments, which support residents in maintaining their desired lifestyles. Based on the stable environment, staff, services and social connections, seniors are safe to explore how to adapt to life changes as they age and their abilities shift (Groger & Kinney, 2007, pp. 98-

100). Often through a detailed decision-making process, many seniors choose to move to CCRCs and remain in these communities until their passing. One study found that, except for residents needing special care from a medical center, 95% of CCRC residents passed away in their CCRCs (Galanos et al., 2004, p. 1401). This illustrates the effectiveness of the CCRC to provide the desired resources and living conditions for seniors throughout their late life.

Guidelines and Resources for CCRC Development and Operation

CCRCs have largely been designed in response to seniors' criteria for choosing their residences by challenging the viability of CCRC facilities as noted above. However, there are limited references providing evidence to help owners and design teams in their decision-making for future projects. First, no rules and regulations for CCRCs exist at the federal level (United States Government Accountability Office, 2010, p. 34). While 30 states have heavily regulated rules and regulations to avoid CCRCs with financial problems while overseeing their finances, there is no evidence to indicate a positive impact of these regulations in reducing the higher bankruptcy rate of CCRCs (Chapter 2, p. 32; Conover & Sloan, 1995, p. 453). Second, there is no guideline for the CCRC built environment as a cohesive unit, unlike other types of senior living facilities such as Independent Living, Assisted Living, and Nursing Home (Facility Guideline Institute, 2018). There may be guidelines for each piece of the CCRC, but nothing addressing the facility in its entirety. Some guidelines have been established by architecture firms for specific elements of senior living facilities, such as biophilic places (Degroff & Wood, 2016), aquatic facilities (Perkins Eastman, 2010a), and dining rooms (Perkins Eastman, 2010b), but these types of partial guidelines cannot address the overall layout and configuration of the CCRC built environment.

Above all, there is a gap between the resources available for real estate developers and design practitioners to support better design and financial viability. In the real estate

development field, statistic analysis tools have been used to understand financial risks (Graaskamp, 1992). Two popular tools are the cost-driven analysis and market-driven analysis. These strategies utilize occupancy rates in the market to establish likely beneficial investments (Godschalk & Malizia, 2017) but do not account for different design characteristics of the built environments of the facilities. In the case of CCRCs, however, tools referencing only the average occupancy rate may not be appropriate to fully understand the financial risks; other important factors, such as considerations seniors may use when deciding which facility best matches their lifestyles, should be included in benefit analyses. Many seniors go so far as to register on a wait list for a specific CCRC, and do not just settle for a CCRC with availability (Groger & Kinney, 2007, p. 100), illustrating their dedication to finding an appropriate match for their desired lifestyle. In other words, the average occupancy rate in the CCRC market as referenced in popular analyses tools is not a sufficient factor to understand the level of financial risks. Other considerations such as built environment criteria and supportive services must be included.

Similarly, references for design practitioners are not linked to financial risks. A previous study (Chapter 2, pp. 21-22) reviewed a set of Post Occupancy Evaluations (POEs) of CCRCs. Facilities and services of CCRCs were addressed through a POE format, but the POE results were not directly related to the performance of the CCRC sample in the market. No matter how well-designed a CCRC facility is according to residents and staff, if the CCRC is not performing well in the market, the continued operation of the CCRC is not stable. This provides uncertainty for the CCRC residents, which was found to be one of the primary concerns across governmental, professional, and academic sectors in CCRC development (Chapter 2, pp. 24-25).

Literature Synthesis

This paper began by establishing the current state of CCRC issues including: 1) conflicting views on CCRCs, 2) seniors' lifestyle considerations provided by CCRCs, and 3) lack of resources and guidelines for CCRC development and operation. Even though the CCRC is often seen as an unfavorable facility for investors or developers, it is consistently filling the market in response to senior demand. One of the reasons for this contradictory phenomenon is likely the preference of seniors toward living in CCRCs. While some efforts have been made to alleviate the gap between the desires of investors and seniors, more efforts are needed. Using this literature review as a foundation, this paper proposes a method for addressing concerns from both CCRC investor and designer, looking at both financial health and characteristics of the built environment and supportive services.

Conceptual Framework and Research Questions

Theoretical Perspective

This study tries to build a bridge between a financial approach and a built environment approach for CCRC development and operation by applying Program Theory. The Program Theory is used as a framework to establish a conceptual relationship between program process and outcome.

We have used it to show the relationship among three elements: 1) built environment characteristics of CCRCs, 2) market performance of CCRCs, and 3) the continued operation of the facility, seeking to provide comfort and stability in their residents' lives.

Figure 3.1. Overview of Program Theory (Source: Rossi et al., 2004, p. 140)

Program Theory consists of two sub-theories: Program Process Theory and Program Impact Theory (Figure 3.1). These theories connect with each other under the larger Program

Theory umbrella, as well as with sub-elements of the theories such as *Target Population*, *Service Arena*, and *Program* in the program process theory and *Proximal Outcomes* and *Distal Outcomes* in the program impact theory. These two connected theories and their sub-elements establish a beneficial framework to understand the implementation and result of a program – or project - by overlaying the project on the established framework.

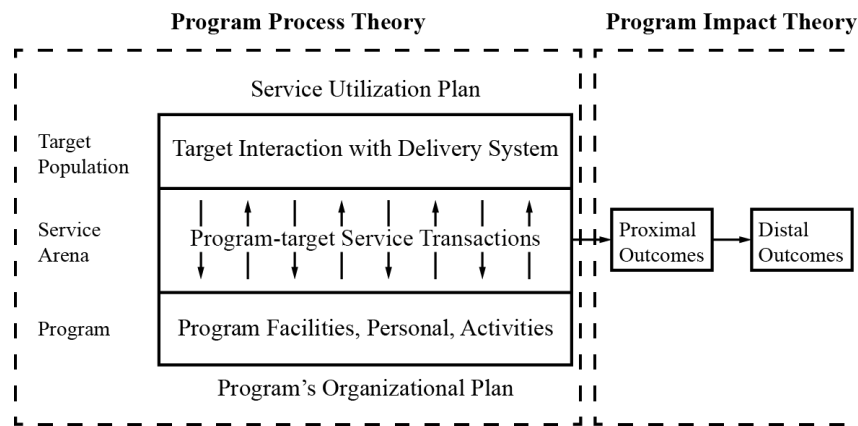


Figure 3.1. Overview of Program Theory (Source: Rossi et al., 2004, p. 140)

This study blended these two sub-theories, Program Process Theory and Program Impact Theory, with different CCRC characteristics (Figure 3.2). The sub-elements of Program Process Theory are matched with CCRC elements including *Residents* (seniors), the *Built Environment*, and *Supportive Services*. As shown in the box on the left of Figure 3.2, these characteristics align with the Program Theory's *Target Population*, *Service Arena*, and *Program*. Similarly, the sub-elements of the Program Impact Theory in the box on the right are aligned with the *Performances of CCRCs in the Market* and the *Assured Stability and Promising Change of CCRCs*. In this instance, the *Performances of CCRCs in the Market* are the Program Impact Theory's Proximal Outcomes, while the *Desired Resources and Living Conditions for Seniors* throughout their late life (p. 39) is the Theory's Distal Outcomes.

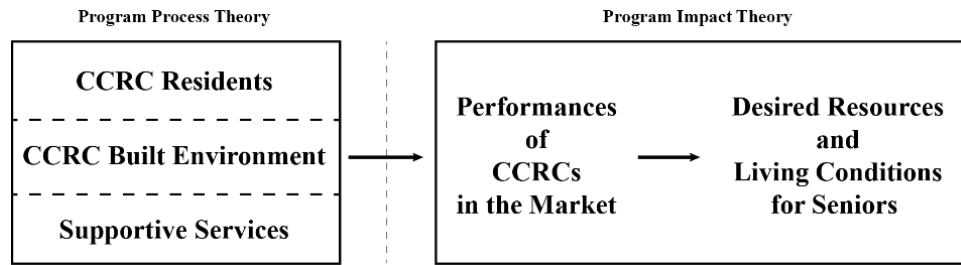


Figure 3.2. Synthesis of Program Theories with CCRC Elements

Conceptual Framework

As shown in Figure 3.2, this study tries to cover both areas of the Program Process and Impact Theories so that it needs a medium to connect the both areas. Review of Precedents, one of the research tools for Evidence-Based Design (McLaughlin et al., 2014, p. 35), provides an additional framework to enable this study to connect the two disparate elements of finance and design. Precedents serve as not only as a data source to evaluate CCRC market performance but also as a reference for future CCRC designs. By systematically evaluating a purposeful sample of CCRC facilities, this research identifies specific characteristics of developed and maintaining CCRCs and relates built environment characteristics to their financial performance (Figure 3.3).

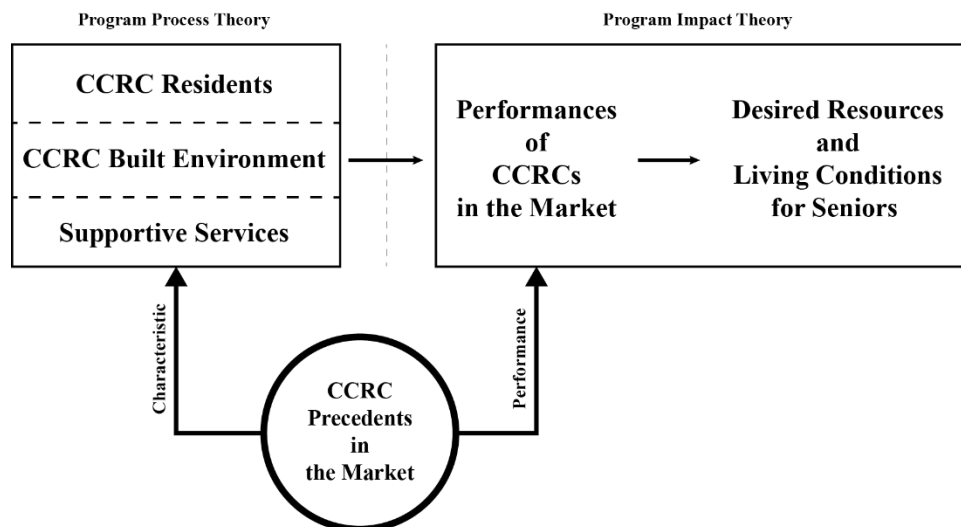


Figure 3.3. Synthesis of the CCRC structure with the Role of CCRC Precedents

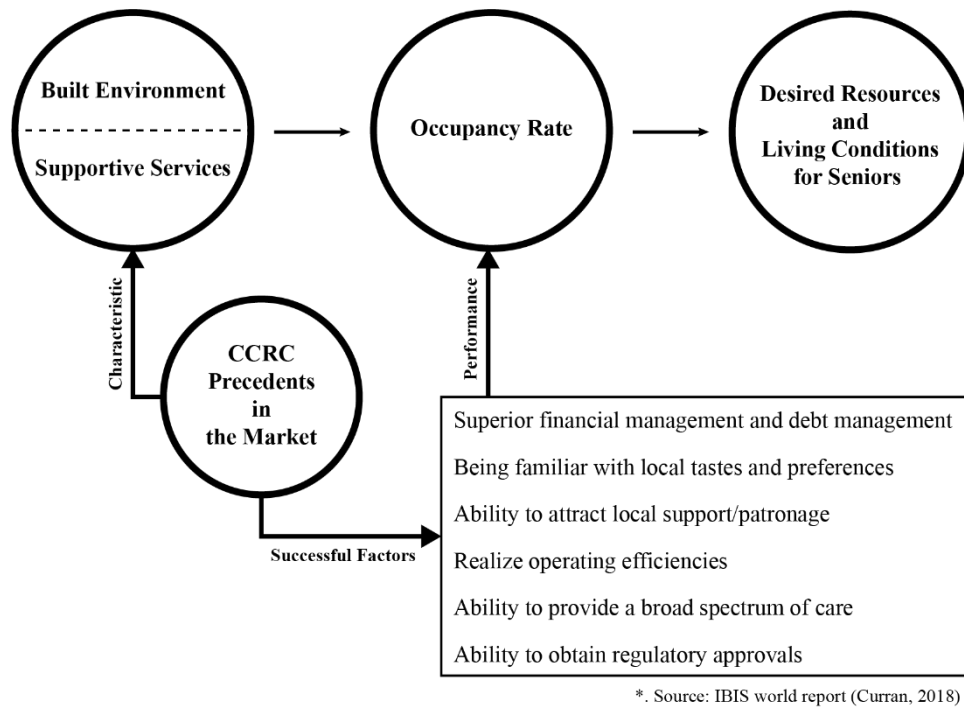


Figure 3.4. Conceptual Framework

This study assumes that CCRC residents from this purposeful sample are somewhat representative of the total group of seniors in the market that prefer CCRCs over other senior living formats. Within this frame, this study specifically explores the possible relationships between elements of the built environment and supportive services with CCRC performance in the market. This approach proposes that the financial performances of these CCRCs, which ultimately result in providing comfort and stability for residents across their lifespan, is impacted in part by the occupancy rates of CCRCs (Nemes, 1989; Zebolsky, 2014). Even though there are another successful factors of CCRCs in the market such as *Superior financial management and debt management, Being familiar with local tastes and preferences, Ability to attract local support/patronage, Realize operating efficiencies, Ability to provide a broad spectrum of care, and Ability to obtain regulatory approvals (cf. for expansion during the operation)* (Curran, 2018, p. 22), all of them are able to be evaluated or implemented after occupation; in detail, the

Superior financial management and debt management, Realize operating efficiencies, and Ability to obtain regulatory approvals are important after securing occupancy rates above a certain level, and the *Being familiar with local tastes and preferences, Ability to attract local support/patronage, and Ability to provide a broad spectrum of care* are important for raising occupancy rates. So, this research establish a relationship aiming to achieve higher occupancy rate. This relationship is shown in the conceptual framework diagram in Figure 3.4.

Research Objectives and Questions

This research explores possible relationships between the built environment/ supportive services of CCRCs and an outcome of desirable or undesirable occupancy rates. This relationship conceptualizes the connections between the built environment/ supportive services and occupancy rates in existing CCRC facilities by using the Program Theory framework as described, and presumes that this relationship impacts increased financial stability despite certain change in the senior-living market, as shown in Figure 3.4. Toward this end, the following research questions are addressed.

RQ1. How can design elements in the built environment and supportive services of CCRCs relate to financial performance? In other words, do differences in CCRC built environment elements and supportive services, compared between fiscally healthy and unhealthy CCRCs, seem to relate to financial health in any way?

RQ2. If certain design elements do show a relationship to financial performance, which characteristics seem to indicate reaching a desirable occupancy rate? In other words, by comparing characteristics of the built environment and supportive services with current trends in North Carolina CCRC developments, this research identifies specific characteristics of CCRCs that may be related to desirable or undesirable occupancy rates.

With these questions, this exploratory research seeks to identify specific characteristics of the built environment and supportive service in CCRCs that may impact financial performance. Overall, this exploration seeks to better understand which characteristics of the built environment might reduce the bankruptcy rate of CCRCs through design strategies.

Study Methodology

Research Strategy

First, this exploration aims to establish current trends in CCRC development over the last decade; these established trends will be used as a baseline to compare CCRC groups between those with desirable or undesirable occupancy rates. Ultimately, this study separates a purposeful sample of North Carolina CCRCs into two groups with desirable or undesirable occupancy rates and explores differences in the characteristics of the built environment and supportive services between groups. Then, this exploration suggests how to increase opportunities to have favorable conditions for financial challenge of CCRCs.

Sample Selection

This research selected the state of North Carolina as the sample boundary and collected data about CCRC facilities in North Carolina. North Carolina was chosen for a number of reasons. North Carolina is one of the top ten states with the most CCRC facilities in the U.S. (Zarem, 2010), and the fourth state in terms of senior population growth. North Carolina is also the first state in ratio of senior population growth in the U.S. from 2000 to 2010 (Werner, 2011, p. 9). Reflecting this growth, North Carolina should see approximately 40 new CCRCs within 15 years if the number of CCRC facilities aligns with the anticipated increasing senior population

(Appold et al., 2015). Given this historic and expected growth, North Carolina is an appropriate location for this exploration.

Data Collection

The primary archival data for this research came from the North Carolina Department of Insurance (NCDOI). The NCDOI is the state department that manages CCRCs that have been certified according to the North Carolina CCRC license rules and regulations (United States Government Accountability Office 2010, p.17). The NCDOI published North Carolina CCRC reports biannually from 2006 to 2010, and annually from 2013 to 2017. These reports include certain characteristics of the built environment, such as numbers of residential units, years of opening, and identifies supportive services such as provided levels of care and activities for each CCRC. This primary dataset was supplemented by information found online from both Google searches and CCRC homepages. This additional data included residential unit options, CCRC building types (apartment, villa, or cottage), locations, and any updated news.

Table 3.1. Collected Characteristics of CCRC Facilities in North Carolina

Categories of Built Environment	Categories of Supportive Services	Occupancy Rate
Location, Year Opened, Number of Residential Units in Total and Each Level of Care, Dementia Care Unit, Swimming Pool/Spa/Sauna, Transportation, Exercise Room, Undergoing Expansion, and Types of Buildings (Cottage/ Villa/ Townhouse/ Apartment)	Residents on the Board of Directors, Pet Allowance, and Exercise Program, Emergency Call System, Swimming Pool/Spa/Sauna, Transportation Available	Occupation rates in Total and Each Level of Care in 2006, 2008, 2010, 2013, 2014, 2015, 2016, and 2017

As a result, this research established a comprehensive compilation of both characteristics of the built environment and supportive services across North Carolina CCRCs, as well as an

idea of chronological occupancy rates of existing CCRC facilities. The types of data and categories are shown in Table 3.1.

Data Analysis

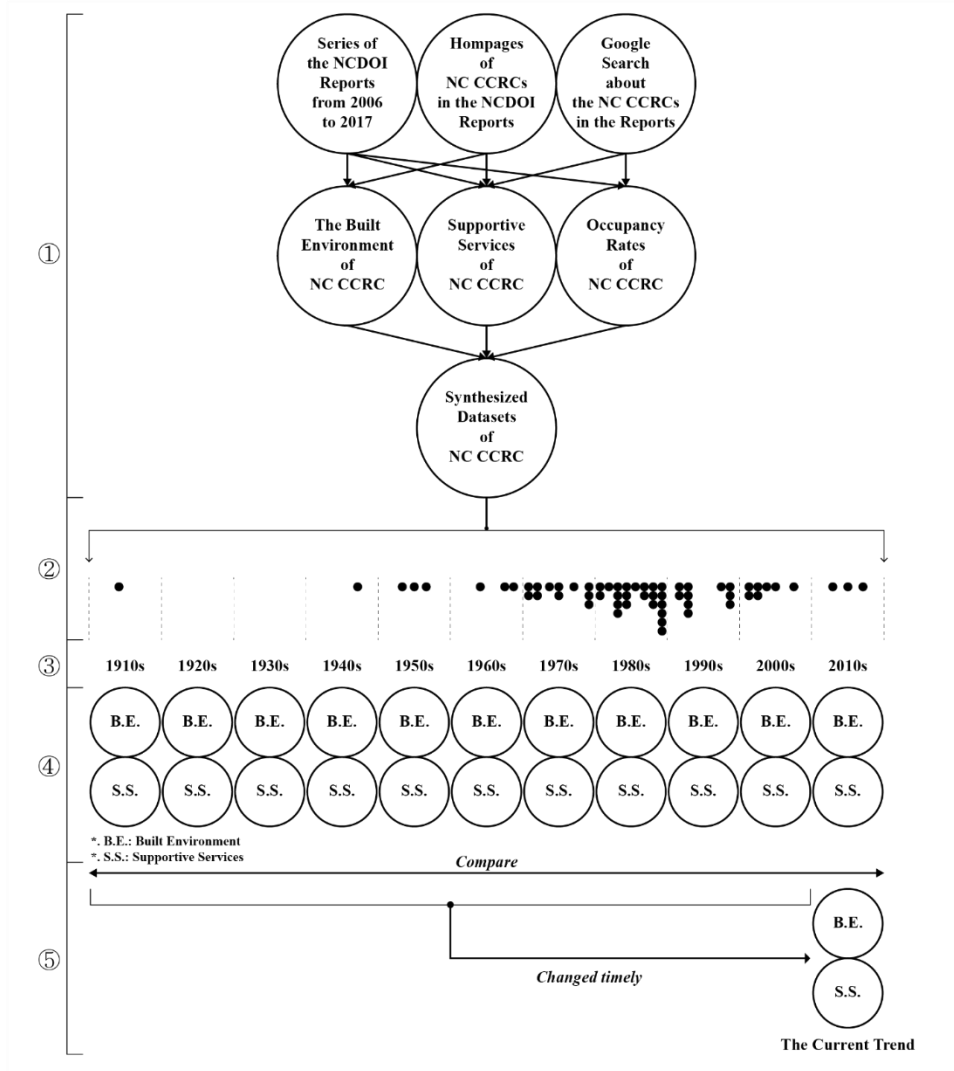


Figure 3.5. Initial Data Analysis

As shown in Figure 3.5, the collected datasets were synthesized into one excel file for initial comparison [①]. The file provides an overview of the types of built environments developed, the supportive services provided, and the occupancy rates recorded for each of 61 North Carolina CCRC. These existing North Carolina CCRC facilities were first sorted by “Year

Opened” to analyze any 10-year trends in the built environment and supportive services, and identify any current trends over the last decade [②]. The CCRCs were then grouped into 10-year cohorts from the 1910s to the 2010s [③]. These 10-year cohorts were analyzed to identify any chronological change of the built environment and supportive services of CCRCs, between the 10-year cohorts [④]. The result of this initial analysis [④] works toward identifying recent trends of the built environment and supportive services in CCRC development [⑤]. These identified trends are used as a benchmark to better explore the research questions (p.44).

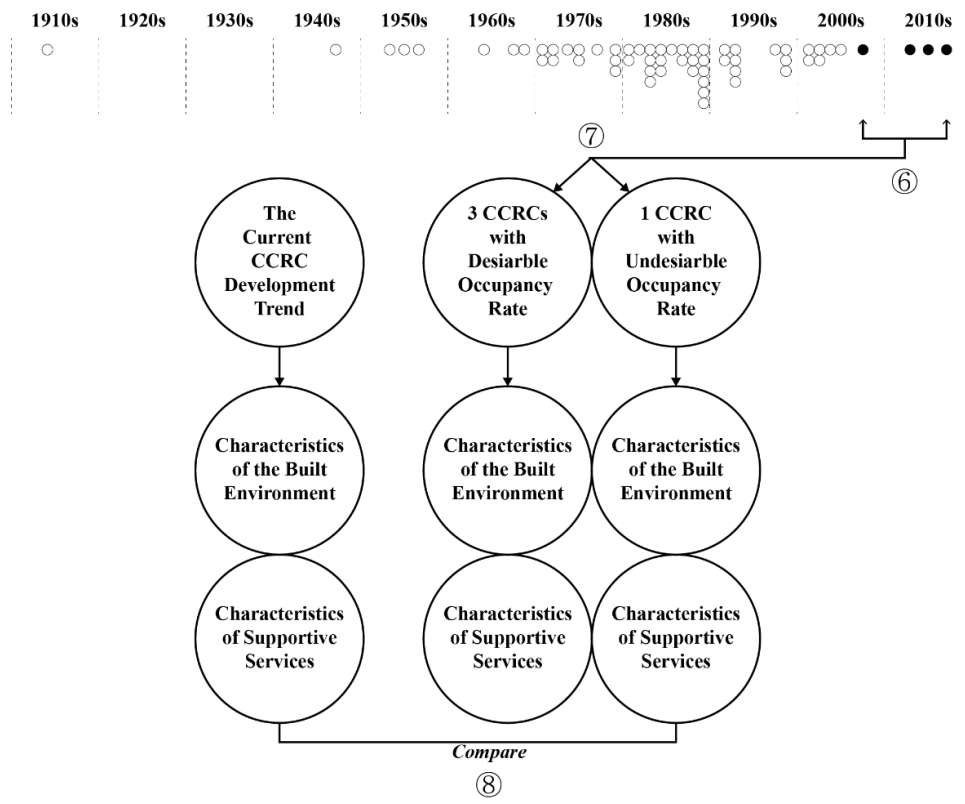


Figure 3.6. Secondary Data Analysis

Building upon the established 61 samples of existing CCRC facilities shown in Figure 3.5 [②], this phase focuses on identifying characteristics of the built environment and supportive services that may be shown to impact occupancy rates in newly developed CCRCs. Figure 3.6 shows the reduction to a sample of CCRCs consisting of those that were opened between 2008

and 2017 [⑥]. From this sample, a smaller cohort of CCRCs was established based on whether or not each facility had recorded a “desirable occupancy rate” [⑦]. This research defines having desirable occupancy rates (Higgins 1993, p.90) when the occupancy rate is over the break-even point of 80% occupied (Zebolsky, 2014) within five years (Nemes, 1989) which are previously established. If a CCRC is less than five years old and has reached the desired occupancy rate of greater than 80%, then it is categorized as a CCRC with a desirable occupancy rate. If not, it is categorized as a facility with an undesirable occupancy rate. Cohorts of CCRCs with desirable or undesirable occupancy rates were established compared to identify similarities or differences in characteristics of the built environment and supportive services [⑧]. This secondary analysis further works toward addressing the research question by establishing similarities and differences in the built environments and supportive services between CCRCs with desirable and undesirable occupancy rates.

This analysis also tries to understand how to better support the CCRC operation process through design strategies in Figure 3.7. This research reviewed CCRC facilities from the last decade (shown as ⑥ in Figure 3.6) to identify any facilities with undesirable occupancy rates [⑨]. This research designates an “undesirable occupancy rate” when CCRCs have occupancy rates either less than the 80% break-even point, as noted above, or record a 10% or more decrease in their occupancy rate from 2006 to 2017. The period between 2006 and 2017 is limited by the availability of datasets from NCDOT, and is therefore the chosen time period. CCRCs identified with undesirable occupancy rates were further analyzed to understand specific characteristics of their built environment and supportive services [⑩], which were then compared to the current trend [⑤ in Figure 3.5). This level of analysis works toward answering the research question by identifying differences in built environment elements and supportive

services in CCRC facilities between two cohorts: those achieving desirable occupancy rates and those with undesirable occupancy rates.

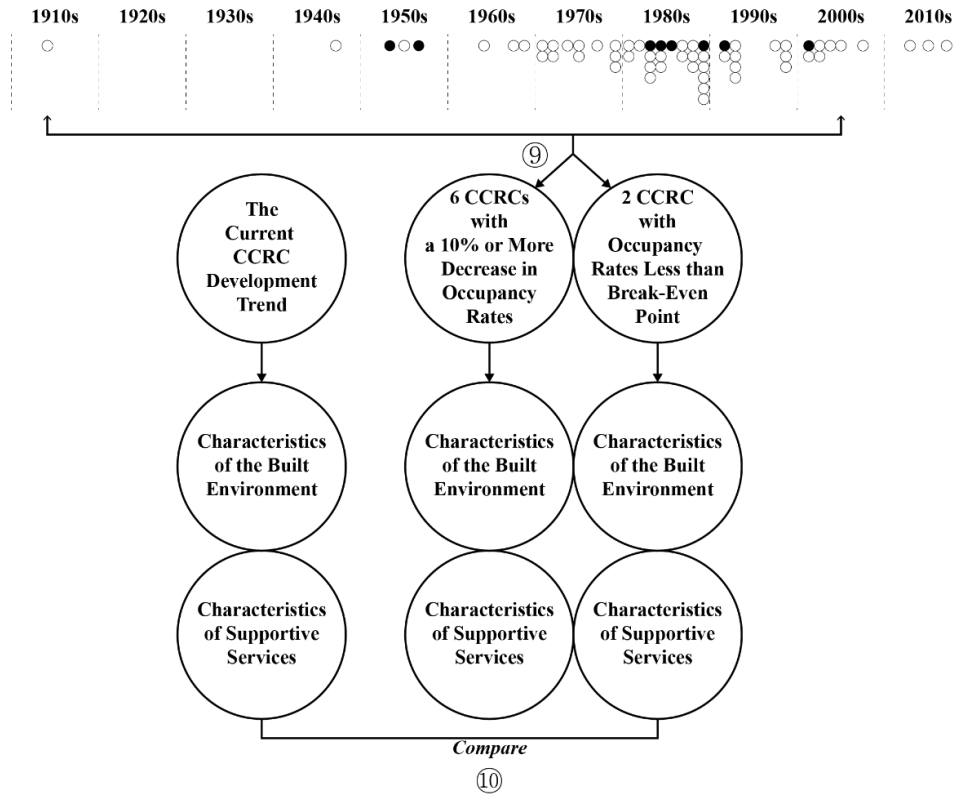


Figure 3.7. Further Data Analysis

Findings

Based on the NCDOI reports from 2006 to 2017, this research found an initial sample of 61 CCRCs located in 34 cities or towns in North Carolina. Of these, one CCRC disappeared and one CCRC merged with another CCRC between 2006 and 2017. The first North Carolina CCRC was opened in Greensboro in 1913. Fifty-nine CCRCs were in operation in 2017, with the most in that year being found in Charlotte, NC, which housed seven facilities. Raleigh and Greensboro had the next largest population with four CCRCs each, and Chapel Hill and Winston-Salem each had three. Except for the two disappeared and merged CCRCs, all of 59 operating CCRCs

identified provide exercise programs and locate in public transportation accessible areas, with 49 of the total 59 providing water activities such as swimming pools, spas, or saunas. With these general characteristics of CCRCs in North Carolina, this research further explored relationships between the built environment and fiscal viability.

A Shift in CCRC Development from the 1910s to the 2010s

This research identifies five factors with notable differences between past CCRC development in North Carolina (before 2008) and development of CCRCs within the last ten years from 2008-2017: 1) location, 2) building types (apartment, villa, cottage), 3) community scale in terms of units provided, 4) proportion of provided levels of care, and 5) residents on the board of directors (Table 3.2). These elements are strictly based on changes in CCRC facilities over time, loosely establishing an understanding of trends in CCRC development.

Table 3.2. Shifts in CCRC Development from the 1910s to the 2010s

	Location: NC Cities with CCRC facilities	Unit Types in CCRCs (Cottage / Villa/ Apartment)	Average # of Total Residential Units (% of IL/AL/NH)	Provided Levels of Care (IL/ AL/ NH/ Dementia)	Residents on the Board of Directors
1910s	Greensboro	100%/ 100%/ 100%	263 (62%/ 5%/ 33%)	100%/ 100%/ 100%/ 100%	0%
1940s	Charlotte	100%/ 100%/ 100%	456 (54%/ 24%/ 22%)	100%/ 100%/ 100%/ 100%	100%
1950s	High Point, Asheville	100%/ 100%/ 100%	270 (61%/ 8%/ 31%)	100%/ 67%/ 100%/ 33%	100%
1960s	Southern Pines, Greensboro, Charlotte	67%/ 33%/ 100%	304 (62%/ 15%/ 23%)	100%/ 100%/ 100%/ 33%	100%
1970s	Newton, Black Mountain, Pittsboro, Winston-Salem, Hendersonville, Candler, Tryon, Lumberton, Chapel Hill, Asheville, High Point	80%/ 70%/ 80%	303 (56%/ 16%/ 28%)	100%/ 100%/ 91%/ 72%	73%
1980s	Winston-Salem, Charlotte, Gastonia, Chapel Hill, Stanley, Burlington, Raleigh, Southern Pines, Thomasville, Pinehurst, Greenville, Morganton, Matthews, Wilmington, Laurinburg, Davidson	53%/ 47%/ 95%	300 (62%/ 11%/ 27%)	100%/ 77%/ 91%/ 73%	59%
1990s	Durham, Columbus, Greensboro, Cary, Salisbury, Fuquay-Varina, Southern Pines, Charlotte	80%/ 50%/ 90%	371 (66%/ 14%/ 20%)	100%/ 100%/ 100%/ 90%	80%
2000s	Arden, Concord, Colfax, Burlington, Chapel Hill, Pittsboro, Raleigh	57%/ 57%/ 100%	285 (73%/ 12%/ 15%)	100%/ 100%/ 86%/ 71%	71%
2010s	Cary, Wilmington, Raleigh	33%/ 0%/ 100%	183 (87%/ 8%/ 5%)	100%/ 67%/ 67%/ 100%	67%

Regarding location, thirty-one of the entire sample of sixty-one North Carolina CCRCs across the entire timeline were located outside the three largest major metropolitan areas (Charlotte-Concord-Gastonia, Raleigh-Durham-Chapel Hill [RDU], and Greensboro–Winston-Salem–High Point) (Chesser, 2013; North Carolina Office of State & Budget and Management, 2013; U.S. Census Bureau, 2018). Prior to the 1980s, the CCRC development pattern was across various regions, but more recent CCRCs have been developed largely in metropolitan areas. In particular, over the past decade from 2008 to 2017, 75% of CCRCs have been located in the RDU region, the second largest metropolitan area in North Carolina. This shows that a tendency to concentrate CCRCs in larger metropolitan areas is a current trend.

Regarding unit types found in CCRCs, the apartment unit has steadily increased while other types, such as the Cottage or Villa, have diminished. This may be related to development in metropolitan areas, which could be a product of limited available land. Aligned with the shift in unit types available, from the 1960s through the 1980s, the overall community scale remained stable at around 300 residential units. However, after peaking in the 1990s, the number of residential units decreased until the 2010s. CCRCs developed since 2010 have been smaller than ever, as shown in Table 3.2. This trend may also be caused by location. Locating in the metropolitan areas often requires a higher cost for land; it could be necessary to decrease the number of residential units according to the project budget remaining after procuring the land, in an effort to manage the financial risk of the CCRC development. In addition to the overall number of total residential units and community scale, there has been a change in the ratio types of units provided. Since the 1990s, numbers of assisted living and nursing home units have continuously decreased in contrast to independent living units. In the 2010s, independent living units have nearly overwhelmed the number of other levels of units. By reducing the numbers of

residential units requiring caregivers, such as Nursing Home or Assisted Living, CCRCs can also reduce the required number of caregiver employees. This is one way to reduce the operation costs of CCRCs. Additionally, each North Carolina CCRC has added twenty-two residential units on average between 2006 and 2017 after they built their initial facility; the increase in units is usually seen after reaching an occupancy rate around 90%.

Regarding supportive services, the number of CCRCs providing units or services for Dementia Care has continued to increase from the 1950s to 2010s, except for a brief pause in the 2000s. All CCRCs developed in North Carolina between 2008 and 2017 provide Dementia care. Given this, providing Dementia care can be seen as one of the current trends in CCRC development in North Carolina.

Lastly, the proportion of CCRCs in which residents or resident representatives are involved in the CCRC Board of Directors has continued to decline since the 1990s. Even though more than half of North Carolina CCRCs still have residents or resident representatives engaged with the CCRC Boards of Directors, a certain number of CCRCs are without residents or resident representative on the boards. Especially, of the 20 CCRCs opened since 1990, 15 CCRCs with resident representatives on the CCRC Boards of Directors have an average occupancy rate of 87.4%, and five CCRCs without resident representatives on the CCRC Boards of Directors have an average occupancy rate of 74.2%. It is necessary to further investigate whether resident participation on the CCRC boards may impact the occupancy rate of CCRCs.

The Newly Developed CCRCs from 2008 to 2017

In the decade between 2008 to 2017, two CCRCs have been opened in Raleigh, and one each has been opened in Cary and Wilmington. Among these four new CCRCs, only one has recorded an undesirable occupancy rate of 26.7% after opening. Even though that CCRC reduced the number

of total residential units by 100 (or 43% of its total residential units) one year after opening, presumably to increase occupancy and fiscal viability, the occupancy rate still did not reach 30%. If this CCRC did not reduce the number of units, its occupancy rate would be less than 15%. On the other hand, two of the four recent CCRCs have reached a 90% occupancy rate within three years since opening; the last of the four recorded a 40% occupancy rate seven months from opening, which is promising, unlike the CCRC with a 26.7% rate over two years.

Table 3.3. Comparison of Newly Developed CCRCs

Occupancy Rate	Location	Building Types of CCRCs (Cottage / Villa/ Apartment)	Average # of Total Residential Units (% of IL/AL/NH)	Provided Levels of Cares (IL/ AL/ NH/ Dementia)	Residents on the Board of Directors
Desirable	Raleigh (2) and Cary (1)	2/3 (67%) / 1/3 (33%) / 3/3 (100%)	221 (82% / 8% / 10%)	3/3 (100%) / 3/3 (100%) / 3/3 (100%) / 3/3 (100%)	3/3 (100%)
Undesirable	Wilmington (1)	0/1 (0%) / 0/1 (0%) / 1/1 (100%)	130 (100% / 0% / 0%)	1/1 (100%) / 0/1 (0%) / 0/1 (0%) / 1/1 (100%)	0/1 (0%)

In Table 3.3, the two CCRC categories (desirable or undesirable occupancy rates) were compared with each other in terms of both the built environment and supportive services. The similarities include apartment-centered communities, independent living-centered communities, and providing both independent living and dementia care. The differences include locations relative to metropolitan areas; provided levels of care (independent living level only versus all levels of care); and the presence of residents on the CCRC Board of Directors. This exploration shows that newly developed CCRCs with desirable occupancy rates in North Carolina are located in one of the major metropolitan areas, provide all levels of care, and invite residents to participate on their Board of Directors. These characteristics are aligned with the recent trends in North Carolina CCRC development and in contrast to the features of CCRCs with undesirable occupancy rates.

In other words, one CCRC was developed in 2016 without aligning with the identified criteria of: 1) location, 2) levels of provided service, and 3) residents on the board. This CCRC also recorded an undesirable occupancy rate 26.15%, putting it in a financially unfavorable situation. This suggests that to financial health of CCRCs may be related to these criteria and trends. As such, practitioners and stakeholders in the CCRC market should particularly explore implementing these three elements in their projects.

CCRCs with Undesirable Occupancy Rates

After analyzing fifty-seven CCRCs that opened before 2008, it was found that six CCRCs in that category recorded a 10% or more decrease in their occupancy between 2006 and 2017. One of the six CCRCs was merged with another CCRC under the same licensed provider, while another disappeared from the NCDOI report in 2010, seemingly going bankrupt in 2013 as evidenced by no employment records in a 2013 financial report (GuideStar Profile, 2019).

Also, there were two CCRCs recording undesirable occupancy rates below 80% between 2006 and 2017, in addition to the six previously identified. Interestingly, the two CCRCs were continuously managed by the same service provider.

As illustrated in Table 3.4, there are common characteristics of the built environment and supportive services between CCRCs that recorded 10% or more occupancy rate decrease and those with undesirable occupancy rates. The group of CCRCs that saw decreasing occupancy between 2006 and 2017 (shown in the top row) have been primarily located outside of major metropolitan areas, with a lower proportion of independent living and a higher proportion of nursing home units. Also, only half percent (50%) of these units seeing an occupancy decrease provide assisted living, dementia care, and water activity programs as identified as trends, though 67% have resident representation on their Board of Directors.

Table 3.4. Similarities in under-achieving CCRCs

Occupancy Rate	Location	Building Types of CCRCs (Cottage / Villa/ Apartment)	Average # of Total Residential Units (% of IL/AL/NH)	Provided Levels of Cares (IL/ AL/ NH/ Dementia)	Provided Services (Swimming pool, Spa, or Sauna)	Residents on the Board of Directors
10% or more decrease	High Point, Asheville, Southern Pines, Burlington, Pinehurst, and Columbus	3/6 (50%) / 2/6 (33%) / 6/6 (100%)	186 (62% / 5% / 33%)	6/6 (100%) / 3/6 (50%) / 6/6 (100%) / 3/6 (50%)	3/6 (50%)	4/6 (67%)
Undesirable	Winston-Salem and Concord	0/2 (0%) / 0/2 (0%) / 2/2 (100%)	212 (64% / 14% / 22%)	2/2 (100%) / 2/2 (100%) / 2/2 (100%)	2/2 (100%)	0/2 (0%)

In comparison to the established current CCRC development trend as reviewed, these CCRCs do not meet some identified trends: 1) location in metropolitan areas, 2) provided levels of care units, and 3) provided supportive services; also, 40% of them do not have residents or resident representatives on the CCRC boards which is aligned with part of observed current trends that the average occupancy rate of CCRC is low when there is no tenant representative (p. 55). Similarly, other CCRCs with undesirable occupancy rates (the second row of Table 3.4) have only apartments as unit options, a lower proportion of independent living and a higher proportion of nursing home units, and no resident representation on their Board of Directors. This group also differs from the current trend in terms of provided levels of care units and resident participation on the CCRC boards. As shown in Table 3.4, CCRCs with undesirable occupancy rates and those with declining occupancy rates seem to not align with the identified trend elements.

By synthesizing the differences and similarities in the CCRC groups above, evidence seems to indicate that CCRCs may find value in considering the following options: 1) remodeling residential units to shift nursing home units to be independent living units and 2) inviting residents to participate on CCRC boards.

Conclusion and Discussion

Conclusion

This research began with an aim to help alleviate financial difficulties in CCRC development and operation by overlaying the disparate perspectives of financial health and built environment in the CCRC model. In response to this aim, this paper has compared and analyzed characteristics of the built environment and supportive services in North Carolina CCRC facilities licensed by NCDOI; the paper proposed current trends in North Carolina CCRC development based on historical data. As compared to this established trend, CCRC developments in North Carolina with healthy occupancy rates are found to: 1) be located in metropolitan areas; 2) have smaller community sizes upon opening, and possibly expanding the number of units after achieving an occupancy rate of around 90%; 3) emphasize apartment-centered units; 4) provide all levels of care from independent living to dementia care; 5) provide water-based supportive services such as a swimming pool, spa, or sauna; and 6) invite residents to participate on the CCRC executive board. This research compared one CCRC group having undesirable financial health with the identified characteristics of successfully developed CCRCs in North Carolina. The result of these exploratory comparisons shows the underperforming CCRC groups did not align well with these identified characteristics of successful CCRCs. Consequently, it is likely that the difference in the desirable or undesirable occupancy rates of the North Carolina CCRCs seems to be determined by the difference in the degree of agreement and disagreement with the above mentioned characteristics. Therefore, to increase opportunities for financially healthy development and operation of CCRC facilities, this research suggests that it is beneficial to more deeply consider the identified characteristics in terms of the built environment and supportive services. These characteristics create a foundation for potential guidelines to support financially viable and resident-supportive CCRC development and operation.

Discussion

Limitations of this study include using data only available through state-level reporting. Since this paper used the NCDOI reports published between 2006 and 2017, it is not possible to incorporate trends or elements that occurred before 2006 and after 2017. For example, some CCRCs may have experienced a sharp rise in their occupancy rates or have gone bankrupt. Furthermore, this research did not seek to identify any hidden story behind the superficially recorded data. For instance, a CCRC was established in 2015 in Wilmington. This CCRC recorded an undesirable occupancy rate between 2016 and 2017. This could be a result of a natural disaster such as Hurricane Matthew in 2016. However, data was collected from the homepages of both NCDOI and the CCRCs licensed by NCDOI, which are open sources or published materials. This research focused on exploring the gap in this area, between fiscal viability and the built environment, without focusing on a deeper understanding.

Future work

The process undertaken in this research was described in detail per phase. Given this, this research could be confirmed and replicated by other researchers. To build upon this exploration, following research should include field research, comprised of observation, interviews, and surveys to further explore and better understand the impact of the built environment and supportive services in CCRCs. These future studies would build upon this important foundation to work toward establishing statistically significant relationships, and more focused case studies. This study is meaningful in establishing the relationship between design and financial results, working toward reducing financial risks in CCRC development and operation through design.

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CHAPTER 4: Article 3

Supporting Continuing Care Retirement Community Stability through Design of the Built Environment

One of the concerns about Continuing Care Retirement Communities (CCRCs) across governmental, professional, and scholarly sectors is the stability of the facility's continuing operation, from the perspectives of both CCRC providers and residents. This paper aims to support the continued operation of CCRCs by exploring the built environment's possible impact on financial stability in a small sample of CCRCs in North Carolina metropolitan areas. This paper identifies elements of the built environment that may contribute to financial stability and proposes possible relationships between the built environment, occupancy rate, and stability of CCRCs through the perspective of Program Evaluation Theory. Using a purposeful sample of CCRCs in the same geographical location with the same categorical services provided in North Carolina, this study explored CCRCs with higher occupancy rates than the average occupancy rate of peer CCRCs. Results show that these particular CCRCs with higher occupancy rates have a total number of residential units ranging from 245 to 354 in Raleigh-Durham-Chapel hill (RDU) and less than 369 in Charlotte-Concord-Gastonia areas. In contrast, other CCRCs in the same areas with the same categorical service configurations, but with lower occupancy rates, have residential unit numbers below 193 or above 542 in RDU or more than 408 in Charlotte-Concord-Gastonia. Further analysis finds that CCRCs with higher occupancy rates in these metropolitan areas have an even more specific range of total residential unit numbers. The differences in the number of residential units between CCRC built environments aligns with a difference in recorded revenue for the CCRCs, reaching up to an increase of 7.7% (RDU) and 4.2% (Charlotte-Concord-Gastonia) of total CCRC revenue. This exploratory research proposes that CCRC stakeholders and design practitioners should specifically consider the number of residential units as a key factor for the design of future CCRC developments.

Keywords: CCRC; continuing care retirement community; CCRC built environment; occupancy rate; viability

Introduction

Continuing successful operation of a Continuing Care Retirement Community (CCRC) is one of the primary concerns of senior living markets, identified as an issue across governmental, professional, and academy sectors (Chapter 2). If a CCRC is operated consistently, the facility can succeed in providing security and life long care to its residents. However, the CCRC format is challenged financially, with higher bankruptcy rates than the other types of senior living facilities. Even though a previous study (Chapter 3) investigated how to increase the financial viability of CCRCs, proposing ways to mitigate financial risks through design, this exploration is limited to suggesting how to raise the bottom line of financial viability; in other words, it is not appropriate to provide better profitability and care services for stability. This paper explores what elements of the CCRC built environments may help to increase the stability, and therefore beyond the financial viability, of CCRCs. This proposed relationship can provide added value to CCRC stakeholders such as governmental officers, developers, and design practitioners to assist in better utilizing built environment elements in new CCRC developments.

Exploring a relationship between the built environment and financial stability of CCRCs is significant. Because not only there is no governmental (United States Government Accountability Office, 2010), professional (Facility Guideline Institute, 2018), and scholarly reference (Park & Rider, 2017) addressing the primary concern of CCRC industry for the continuing successfully operation of CCRCs, but also there is opposing views on CCRCs between investors reluctant to supply CCRCs and seniors demanding CCRCs because of the financial risks. Better understanding the possible relationship can directly support both

developers (providers) and residents (seniors) of CCRCs. If specific elements of CCRC built environments are understood to be beneficial to the overall stability of CCRCs, then developers can look to implement these specific conditions in their CCRC developments for a better return on their investment and increased service quality. This insight could result in residents being more satisfied with their living arrangements, and staying at their CCRCs for the duration of their lives without the worry of needing to move if the CCRC is unsuccessful or unsatisfactory. By identifying these potential relationships, this research will establish a foundation for a guideline for CCRC development. This guideline can illustrate how design practitioners can work toward producing CCRC facilities to satisfy both developers and residents.

Literature Review

To understand the current state of CCRC development, it is necessary to review literature addressing the meaning of successful “continued operation” of CCRCs, for both CCRC providers and residents. It is also important to understand how the design practice has engaged the CCRC development process. This chapter first reviews literature on the continuing operation of CCRC facilities. Next, literature is reviewed to understand more about the impact of the occupancy rate of CCRCs, which impacts whether a CCRC could be operated continuously. Finally, the CCRC development process is described to outline the considerable factors in CCRC development. This synthesis of these areas establishes a foundation to guide this research.

Financial Viability of CCRCs

Since its inception, the CCRC format has become a leading trend in the retirement community industry (Curran, 2018, p. 15). However, CCRCs have been seen as less attractive for investors interested in senior housing because these types of facilities are complex to operate, difficult to

develop, and low in liquidity (Lynn & Wang, 2008, p. 47). In response to this complexity, there are cases in which a CCRC has gone bankrupt (Morrison et al., 1986, p. 58); CCRCs record higher bankruptcy rates than the other types of senior living facilities (Conover & Sloan, 1995, p. 453). Additionally, Conover and Sloan (1995) reported that there is no evidence that any governmental intervention, such as moitering financial statement or tough licensing process of CCRCs, established to minimize financial risks of CCRCs works properly, despite thirty states having regulations around CCRC development and operation. As a result, the stable, continued operation of CCRCs is one of the common concerns across the governmental, professional, and scholarly sectors (Chapter 2). Chapter 3 of this research then investigated possible impacts of the design of CCRCs on fiscal viability, exploring possibilities to increase the bottom line of the CCRC financial health through specific design elements. To continue, it is necessary to use this previous foundation to explore more in depth how to address the financial viability of CCRCs to reach out to the stability of CCRCs.

Occupancy Rate as an Impact on Economic Viability in CCRCs

Many reports and articles identify the occupancy rate of CCRCs as an important indicator in achieving financial stability. To better understand any relationship between occupancy rate and CCRC stability, this study reviewed the U.S. Census database of industry revenue structures. A set of estimated sources of revenue for Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly are provided in the annual service survey data from 2018, compiled by the U.S. Census and the U.S. Department of Commerce (U.S. Census Bureau, 2018b), shown in Table 4.1.

Assuming that the data in Table 4.1 is representative of CCRCs as a whole, these types of facilities have earned an average of 49.81% ($= (49.44\% + 49.95\% + 50.05\%) \div 3$) of their

revenue from Patient out-of-pocket payments between 2015 and 2017. Only an average of 10.96% ($= (11.44\% + 10.66\% + 10.77\%) \div 3$) of the revenue between 2015 and 2017 is from non-patient care. Therefore, an average of 89.04% ($= 100\% - 10.96\%$) of revenue is from a combination of care services for residents and government assistance programs (U.S. DHHS, 2017); sub-revenues for government programs are to support occupied residents and sub-revenues for patient care are from occupied residents so that these are related to the occupancy rate. This data provides additional support that occupancy rate is, among a number of other influences, closely related to the financial viability of CCRCs.

Table 4.1. Estimated Source of Revenue for Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly (Source: U.S. Census Bureau 2018)

	2017		2016		2015	
	Estimate	Percentage	Estimate	Percentage	Estimate	Percentage
Total Revenue	63,627 M	-	61,160 M	-	58,488 M	-
Sub-Revenues for Government Programs		15.30%		16.05%		14.91%
Medicare	4,228	6.64%	4,085	6.68%	4,014	6.86%
Medicaid	5,513	8.66%	5,105	8.35%	4,708	8.05%
Workers' compensation	S ^a	--%	S ^a	--%	S ^a	--%
All other government programs	S ^a	--%	625	1.02%	S ^a	--%
Sub-Revenues for Patient Care		0.95%		0.95%		0.95%
Private health insurance	4,712	7.41%	4,516	7.38%	4,041	6.91%
Property, auto, and casualty insurance	12	0.02%	12	0.02%	12	0.02%
Social security	S ^a	--%	593	0.97%	555	0.95%
Patient out-of-pocket	31,460	49.44%	30,549	49.95%	29,276	50.05%
All other sources of revenue for patient care	8,986	14.12%	9,050	14.80%	8,652	14.79%
Sub-Revenues for Non-Patient Care		11.44%		10.66%		10.77%
Contributions, gifts, and grants received	602	0.95%	602	0.98%	650	1.11%
Investment and property income	911	1.43%	626	1.02%	511	0.87%
All other non-patient care revenue	5,767	9.06%	5,298	8.66%	5,139	8.79%

*a: S: Estimate does not meet publication standards because of high sampling variability (coefficient of variation is greater than 30%) or poor response quality (total quantity response rate is less than 50%) or other concerns about the estimate's quality. Unpublished estimates derived from this table by subtraction are subject to these same limitations and should not be attributed to the U.S. Census Bureau. For a description of publication standards and the total quantity response rate, see <http://www.census.gov/about/policies/quality/standards/standardf1.html>.

This data provides additional support that occupancy rate is, among a number of other influences, closely related to the financial viability of CCRCs. This research therefore assumes that the occupancy rate can be used as a preliminary indicator of the financial viability of CCRCs.

CCRC Development Trends

In practice, location and services provided are also important considerations for CCRC development. According to a retirement community industry report (Curran, 2018, pp. 21-25), location is a significant factor in overall business performance in the retirement community market. Seniors desire to live in familiar areas close to family, friends, and in support of desirable lifestyles. Available supportive services are also strategic elements that can help to differentiate between one CCRC and competitors in similar locations.

Both industry reports and academic research also support the importance of criteria of location and services. Kwon et al. (2016) found that U.S. baby boomers identifying with a community-centered “Engaged Lifestyle” prefer to live in one of the following three conditions: 1) supportive housing specialized for seniors with available medical support, 2) apartments offering residential units smaller than previous homes, and 3) city or sub-urban locations (Kwon et al., 2016, pp. 258-259).

These two specific strategies, location and supportive services, can be seen in the recently built CCRC facilities. According to the *Design for Aging Review* (AIA, 2018), over the last ten years senior living facilities, including CCRCs, have been largely developed in suburban areas, followed first by urban then rural areas; the report also found that the size of private living units, with the exception of nursing homes needing space for extra supportive services, has decreased; for example of average residential unit sizes, one bedroom in Independent Living was 844 square

feet to 627 square feet, and one bedroom in Assisted Living was 581 square feet to 508 square feet; finally, the AIA report finds that the number and diversity of public spaces in CCRCs has increased to support resident health and wellness (AIA, 2018, pp. 177-187). Consequently, in the CCRC industry, location and services have been emphasized in the built environment, as shown in both trends of the industry as well as research outcomes.

Literature Synthesis

CCRCs are an important model of senior living. With the aim to care for residents over the entire span of their life, CCRCs have been studied from different perspectives to better understand and support the viability of this complex building type. Occupancy rate is one element impacting the financial viability of CCRC, affecting approximately 89.04% of CCRC revenue. To increase occupancy rates, location and supportive services have been identified as a trend over the last decade in CCRC development.

This literature review establishes the need to explore specific elements in CCRC built environments that may be related to higher occupancy levels. Better performance of these particular elements may increase CCRC occupant satisfaction, thereby increasing the viability and stability of the facility's continuing operation. This focus will start to establish a deeper understanding of these type of relationships to guide future CCRC development by providing a framework for reference. This framework will work to support the stability, continuing operation, and financial viability of CCRCs.

Conceptual Framework and Research Questions

As evidenced by the literature, the role of the CCRC built environment can be important in supporting the financial viability and stability of CCRCs. This research begins to provide a

framework using the built environment as a significant element in impacting a CCRCs occupancy rate.

Theoretical Perspective

This research uses Program Theory to establish a conceptual relationship between certain CCRC built environment elements and the occupancy rate of the facilities (Rossi et al., 2004, p. 140). Program Theory allows the CCRC facility to be divided into specific built environment areas, enabling the Program Theory structure to measure the performance of each element. Through this approach, specific elements of CCRC built environments can be measured to understand how well each element might impact occupancy rates.

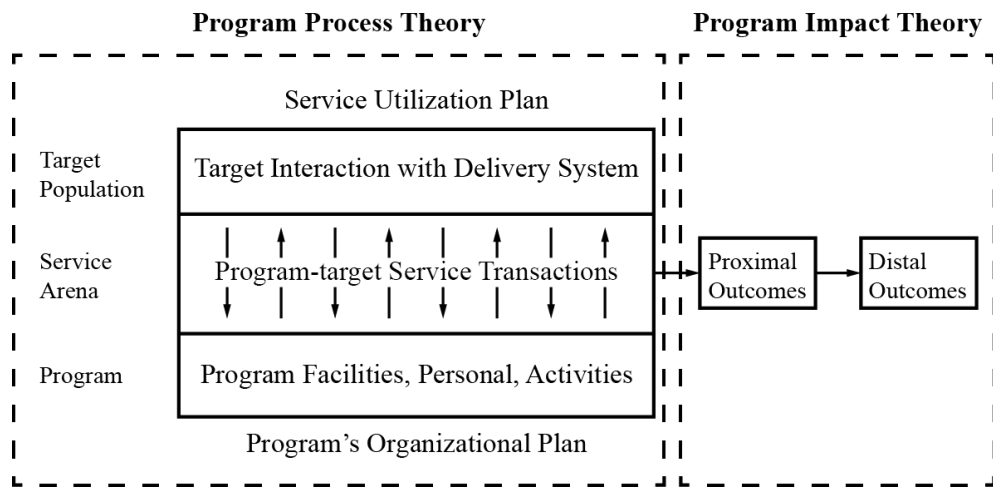


Figure 4.1. Overview of Program Theory (Source: Rossi et al., 2004, p. 140; Chapter 3)

Program Theory has two sub-theories: Program Process Theory (Figure 4.1: Left) and Program Impact Theory (Figure 4.1: Right) (Rossi et al., 2004, p. 140); each sub-theory is beneficial to frame implementation and result phases of a project. Since this research explores developed and operating CCRCs through these implementation and result phases, both will be used in this research by overlaying this exploration on these theories' frameworks.

The Program Process Theory addresses relationships between 1) target population, 2) service arena, and 3) program. For this research, the *target population* will be CCRC residents, the *service arena* will be the CCRC built environment, and the *program* will be supportive services. In other words, the CCRC built environment (service arena) operates with CCRCs' particular programs (supportive services) to support their residents (target population) (Figure 4.2).

Program Impact Theory includes proximal outcomes and distal outcomes. Proximal outcomes are intermediate outcomes as the result of the program process structure; distal outcomes are the achievement of ultimate goals in the program as the impact of the proximal outcomes. In this framework of the Program Impact Theory, the proximal outcomes of CCRCs are their occupancy rates. The distal outcome is the overall stability and increased viability of the CCRCs (Figure 4.2).

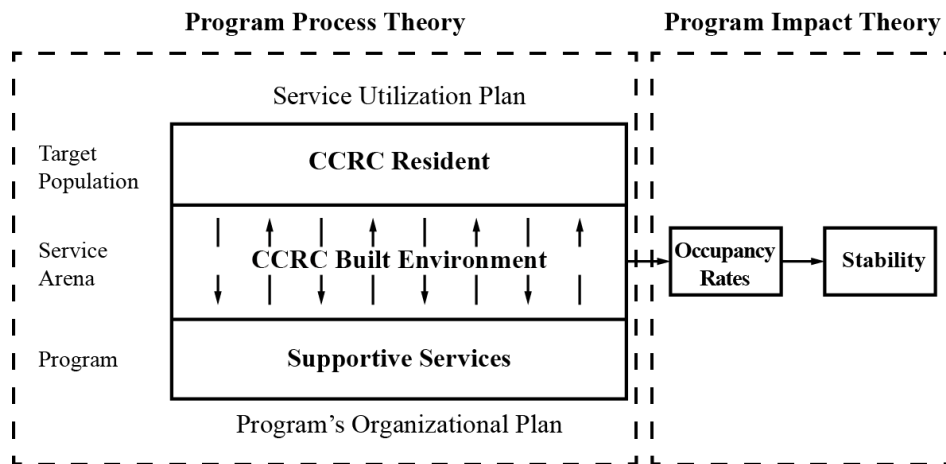


Figure 4.2. Synthesis of Program Theory with CCRC Structure

Conceptual Framework

Using Program Theory to inform the theoretical perspective (Figure 4.2), this research proposes a new framework to establish a preliminary relationship between the developed CCRC built environments and their impacts through a *review of precedents* (McLaughlin et al., 2014, p. 35). The *review of precedents* is a subjective and context-specific approach to research by using existing study subjects as the source of data (Figure 4.3).

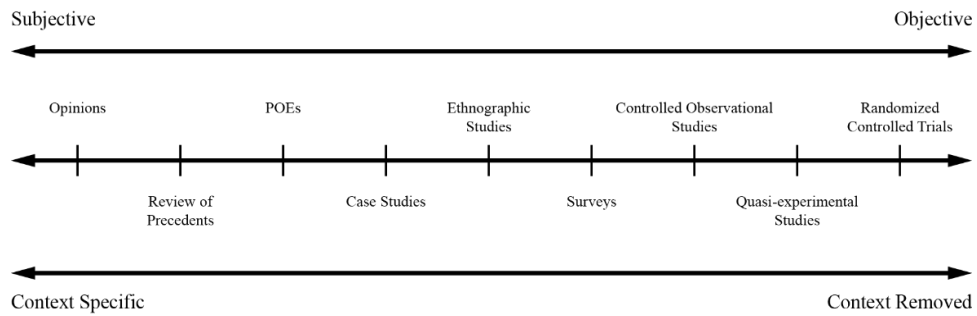


Figure 4.3. Types of Evidence-based Research Tools (Source: McLaughlin et al., 2014, p. 35)

In this study, the study precedents, or subjects, are existing CCRCs with specified locations and services. While Chapter 3 (pp.42-43) developed a conceptual framework using a review of precedents, this chapter conceptually connects the CCRC residents, built environment, and supportive services with the occupancy rate using data from existing facilities (Figure 4.4).

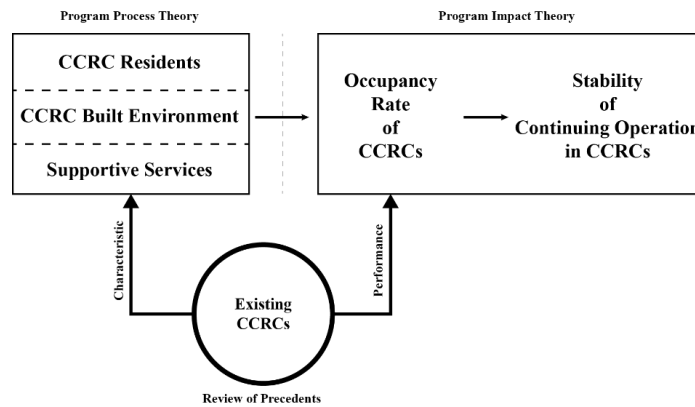


Figure 4.4. Synthesis of Program Theories with Review of Precedents

This research limits the locations and services of sample CCRCs, focusing on identified factors that are proposed to increase CCRC viability. Additionally, by assuming that CCRC residents in the same location have relatively similar characteristics, this study concentrates on exploring the impact of the CCRC built environment on the occupancy rates. This conceptual framework is shown in Figure 4.5.

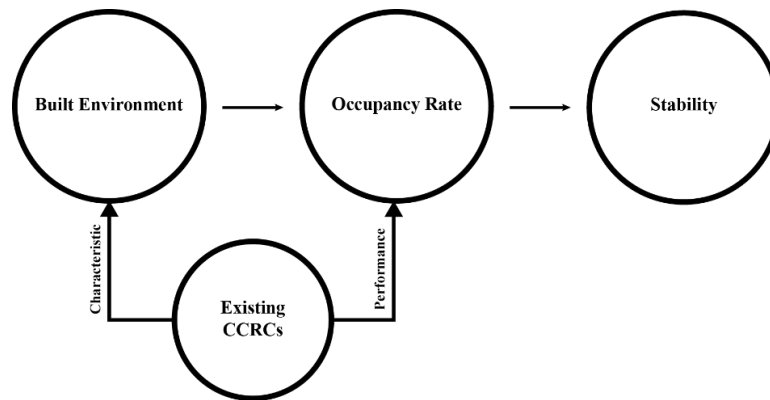


Figure 4.5. Conceptual Framework

Research Objectives and Questions

The overarching goal of this research is to provide a foundation to guide CCRC development by further defining relationships between the built environment and the occupancy rates for these facilities. This research aims to inform design practitioners engaged in CCRC design about specific built environment elements that are likely to result in a higher occupancy rates for their clients. By exploring CCRCs with similar conditions, specifically with the same location and provided services, this research aims to: 1) further explore difference in the built environments when the occupancy rates of CCRCs are high or low; 2) describe particular conditions in these built environments that are likely to influence occupancy rates; and 3) interpret possible degrees of impacts of the built environment on CCRC financial viability. Through this process, this research will contribute to forming a new body of evidence-based knowledge about what

elements of CCRC built environments can be further explored to better support higher occupancy rates for new developments. As such, the research questions are as follows.

RQ1. What characteristics of CCRC built environment may relate to a higher occupancy rate? In other words, what differences are found in the built environments of CCRCs with higher or lower occupancy rates? This comparison will provide an initial groundwork for further exploring possible relationships.

RQ2. How much difference is there in occupancy rates of CCRCs with the identified characteristics compared to those without? In other words, if a CCRC has the identified characteristics identified in RQ1, what amount of increased revenue might these CCRCs have over the other CCRCs without the identified characteristics? This question will further explore how much these different built environment characteristics may be linked to occupancy rate and facility success. Between the two, this research seeks to propose specific characteristics of CCRC built environments that may increase the opportunity for higher occupancy rates.

Study Methodology

Research Design

This research further evaluates existing data regarding the impacts of the CCRC built environment on the occupancy rates of these facilities, building upon the work done in Chapter 3. The previous research explored the impacts of certain built environment elements and provided supportive services on CCRC occupancy rates in a select sample, aiming to reduce financial risks for this complex building type. This chapter now aims to focus on how the built environment may contribute to the stability and continuing operation of CCRCs, beyond the initial concern of financial viability of developing a facility.

Chapter 3 established a baseline for financially viable North Carolina CCRCs by identifying characteristics of the built environment and provided supportive services including: 1) metropolitan area-centered locations [Charlotte-Concord-Gastonia, Raleigh-Durham-Chapel Hill, and Greensboro–Winston-Salem–High Point, which have populations of at least one million (U.S. Census Bureau, 2018a); since the 1980s, the CCRC developments have been concentrated in these three regions (Chapter 3, p. 53).]; 2) starting with smaller community sizes and expanding the number of units after achieving an occupancy rate of around 90%; 3) primarily apartment-style units; 4) provide all levels of care including dementia care on site; 5) water-based services such as swimming pool, spa, or sauna; and 6) inviting residents to participate on the CCRC executive board. This next stage of exploration focused on particular metropolitan area-centered locations within the larger North Carolina sample [1] that have CCRCs with the ability onsite to provide all levels of care including dementia care [4]; these matters of location and provided services and significant factors in the market performance (Chapter 4, p. 72); by using a small, purposeful sample of facilities in North Carolina, this exploration focuses more on the built environment of CCRCs. Also, existing CCRC datasets can be explored to identify previously undefined relationships between built environments and occupancy rates.

Research Samples

This research selected North Carolina as the research sample area. Looking at the senior population growth of each state in the United States from 2000 to 2010, North Carolina ranked fourth with an increase of 265,031 in individual senior population after California (+650,856), Texas (+529,354), and Florida (+452,005). Among these top four states, North Carolina recorded the highest percentage growth rate (+27.3%) of the senior population from 2000 to 2010 (Werner 2011, p.9). Additionally, North Carolina is one of the top ten states in the country with the most

CCRCs (Zarem, 2010). By 2034, the senior population in North Carolina is predicted to grow 1.68 times compared to the senior population of 2014 (Appold et al., 2015). As of 2017, there were 59 CCRCs in North Carolina (North Carolina Department of Insurance, 2017). If the number of CCRCs in North Carolina increases in proportion to the anticipated senior population growth, by 2034 the state will have approximately 40 new CCRCs. Given the anticipated growth in both the senior population and number of CCRCs, North Carolina is an appropriate location for this study.

Data Collection

Data was collected about CCRCs in North Carolina from the North Carolina Department of Insurance (NCDOI). NCDOI has an organized index of registered CCRCs adhering to established North Carolina rules and regulation (NCDOI 2017) on its homepage. In addition to gathering data from NCDOI's index, homepages of each CCRC listed through NCDOI's index were visited for supplemental data points. The homepage addresses of CCRCs listed with NCDOI were found through Google. The CCRCs' homepages provided additional data including types and sizes of residential units, amenities of residential units and communities, and lists of activity programs open to the public and likely of interest to potential residents.

Data Analysis

The NCDOI dataset was entered into an excel file identifying individual CCRC locations, levels of care (independent living, assisted living, and nursing homes), and occupancy rates. Using this document as a foundation, this research was conducted with three phases: 1) sorting sample CCRCs by different characteristics, 2) aligning occupancy rates with built environment elements, and 3) outlining results.

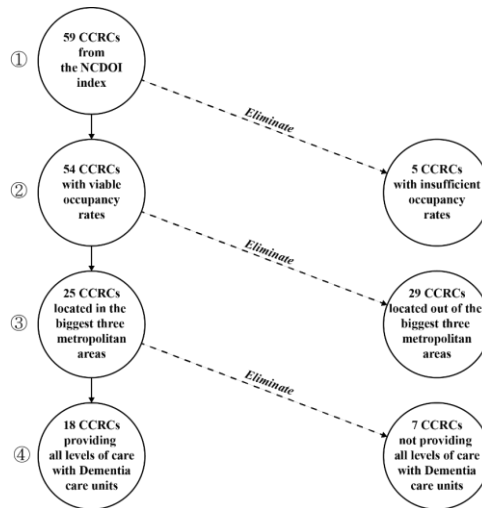


Figure 4.6. Initial Data Sorting and Analysis

In the beginning, there were fifty-nine CCRCs in the file as shown in ① in Figure 4.6. First, five of the fifty-nine CCRCs were eliminated [②] from the data set for not reaching an occupancy rate of 80%, established as the break-even point for a financially viable CCRC (Zebolsky, 2014). These centers were eliminated because this research focuses on characteristics of CCRCs with occupancy rates above viable occupancy levels. Second, twenty-nine CCRCs were excluded from the sample [③] because of their location outside one of the three largest metropolitan areas in North Carolina; only twenty-five CCRCs in the three metro-areas of Charlotte-Concord-Gastonia (CLT), Raleigh-Durham-Chapel Hill (RDU), and Greensboro–Winston-Salem–High Point (GBO) remained in the sample (Chesser 2013; NCOSBM 2013; U.S. Census Bureau 2018b). This location criteria is one of the two previously proposed primary characteristics for CCRCs with viable occupancy rates from Chapter 3. Finally, seven CCRCs were removed [④] because they do not provide all levels of care (Independent Living, Assisted Living, and Nursing Home) with Dementia care service, which is the other characteristic established in Chapter 3. Through this sorting process, eighteen sample CCRCs met the two target criteria of metro-area location and provided supportive service levels.

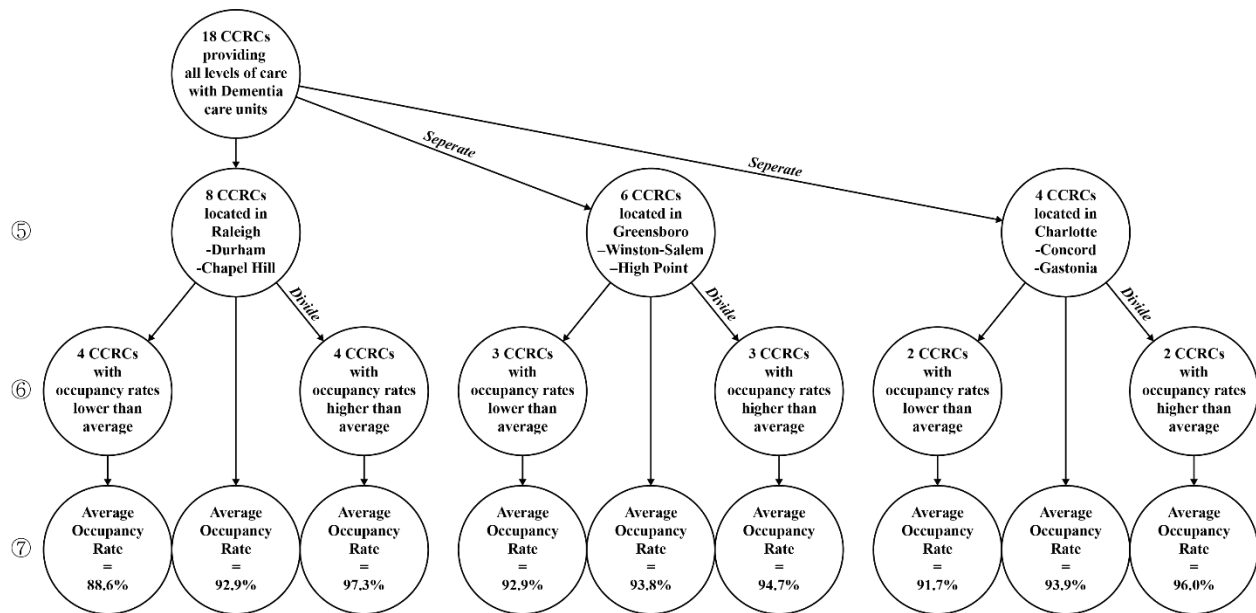


Figure 4.7. Secondary Data Analysis

With this established sample of eighteen CCRC facilities, the aim is to group CCRCs with like average occupancy rates, creating a groups with high occupancy rates and low occupancy rates for the same general location. In Figure 4.7, these eighteen CCRCs were broken out into each of the three metropolitan areas [⑤]. These three region-based groups were then separated into two sub-groups: CCRCs Rate with above-average occupancy rates and those with less than average occupancy rates [⑥]. Based on the occupancy rates above and below the established threshold, equal numbers were found to be in each of the two sub-groups within each region. These divided sub-groups in the same regions were then compared 1) with each other's average occupancy rates (means) and 2) between each group and each group's regional average occupancy rates (means) [⑦]. The goal of this secondary analysis is to classify CCRCs according to their occupancy rates and prepare to better understand differences in the built environments when CCRC facilities have occupancy rates "lower" and "higher".

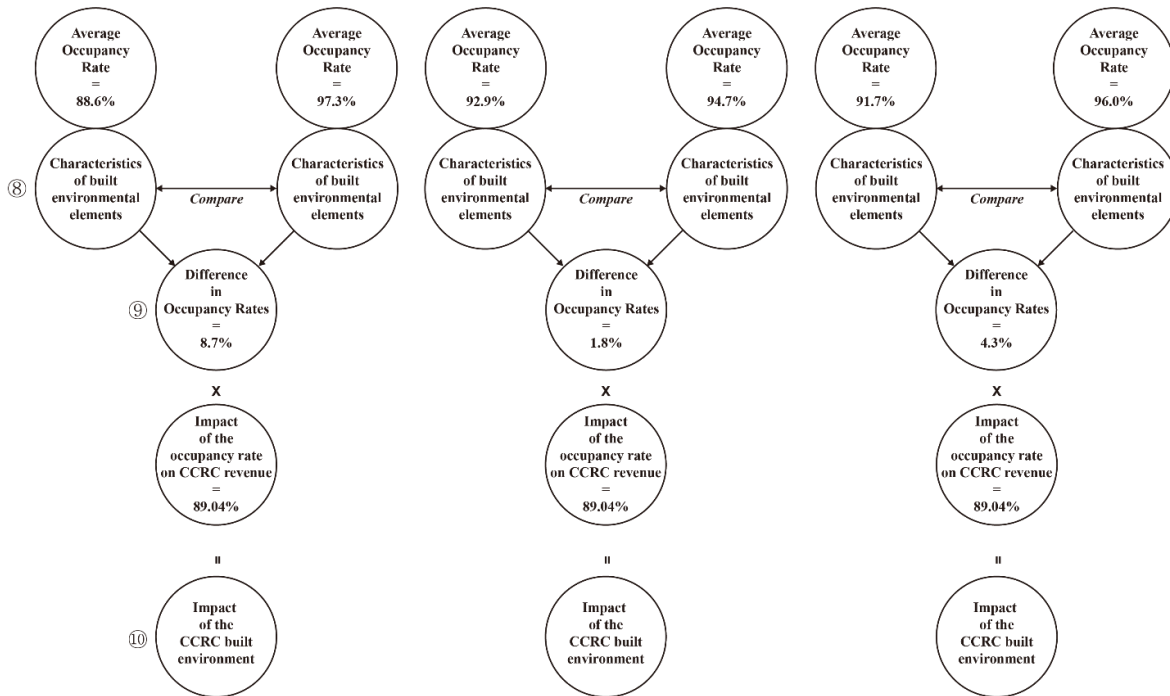


Figure 4.8. Further Data Analysis

Lastly, once CCRCs were classified into “higher” and “lower” CCRC groups through the secondary data analysis as shown in [7] in Figure 4.7, each of paired groups’s characteristics of built environments were explored and compared [8] in Figure 4.8. For this, the additional data gathered from the CCRCs’ homepages was entered into the base excel file to include building types, residential unit types and sizes, and amenities. These design elements were then compared, exploring differences or similarities between the “higher” and “lower” CCRC groups. Next, any difference in occupancy rates between the “higher” and “lower” CCRC groups was calculated [9]; that difference was then multiplied by 89.04%, the influence of the occupancy rate on revenue structure that was previously calculated in Chapter 4 (p. 71). As a result, this research proposes that there is indeed an impactful relationship between specific design elements and the CCRC revenue structure [10].

Findings

CCRCs in Three Metropolitan Areas

In total, six groups of CCRCs located in three locations: 1) Raleigh-Durham-Chapel Hill (RDU); 2) Greensboro–Winston-Salem–High Point (GSO); 3) Charlotte-Concord-Gastonia; are ready to be compared through the analysis process. All of CCRCs in the six groups have invited residents on the CCRC board of directors and only one CCRC does not allow for pet. This chapter compared certain built environment elements of CCRCs between facilities with “higher” and “lower” occupancy rates to identify similarities and differences between the two (Table 4.2, 4.5, and 4.6). This comparison uses categories of built environmental characteristics: 1) year opened, 2) number of total residential units, 3) number of independent living units, 4) number of assisted living units, 5) number of nursing bed units, 6) availability of dementia care unit, 7) availability of emergency (medical) call system, 8) presence or absence of facilities for water activities (swimming pool, spa, or sauna), 9) availability of (public) transportation near center, 10) availability of exercise rooms or programs, and 11) facility building types of communities (cottage, villa, or apartment).

Beside of these eleven characteristics above, this exploration has collected private residential unit sizes, area scale of CCRCs, floor plans, price ranges, pictures, facility concept, philosophy, and reviews of CCRCs partially, not all CCRCs in the six groups. These collected characteristics are not only available in some CCRCs but also difficult to make a contextual comparison. For example, in the case of residential unit sizes, one CCRC offers six types of cottage units with 1,766 to 3,914 SQ. FT., two types of villa units with 2,000 SQ. FT., nine types of one bedroom units with 931 to 1,402 SQ. FT. in the apartment building type community, and eighteen types of two bed room units with 1,204 to 2,294 SQ. FT. in the apartment building type

community; some of the offered one bedroom unit are bigger than some of the offered two bedroom units; another two bedroom units in the apartment building type community are bigger than other residential units in cottage or villa building type community; additionally, there is no available data for occupancy rates per type of residential unit; in other words, it is not possible to explore the relationship between the size or types of residential units and occupancy rates. Therefore, this exploration only uses the eleven categories of built environmental characteristics.

Table 4.2. Comparison of Built Environment Design Elements between the Higher and Lower Occupancy RDU CCRC Groups

	<i>Group 1 (Lower)</i>				<i>Group 2 (Higher)</i>			
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
Occupancy Rate (Mean)	88.6%				97.3%			
Occupancy Rate	83.3%	89.1%	90.8%	91.3%	94.7%	96.8%	98.3%	99.2%
Year Opened	1984	2013	1983	1999	2008	1993	2004	1992
Total Units	582	193	609	542	245	344	354	341
Independent Living_Units	391	169	440	402	205	224	306	249
Assisted Living_Units	18	8	79	30	4	49	4	34
Nursing Bed_Units	173	16	90	110	36	71	44	58
Dementia Care	O	O	O	O	O	O	O	O
Emergency Call System	O	O	O	O	O	O	O	O
Swimming Pool/Spa/Sauna	O	O	O	O	O	O	O	O
Transportation Available	O	O	O	O	O	O	O	O
Exercise Room or Programs	O	O	O	O	O	O	O	O
Cottage_Facility types	O	O	X	O	O	O	O	O
Villa / Townhome_Facility types	O	X	O	X	O	X	O	O
Apartment_Facility types	O	O	O	O	O	O	O	O

During the comparison, this exploration identified that all CCRCs in the six groups have contextual commonalities such as: providing dementia care units [6], providing emergency medical call system [7], having facilities for the water activities such as swimming pool, spa, or sauna [8], locating in where public transportation available [9], providing exercise room or programs [10], as well as facilities with the type of apartment [11]. So, this exploration tried to

figure out notable differences between CCRC groups with higher or lower occupancy rates than the average occupancy rates of each metropolitan area in the other categories of characteristics.

Table 4.3. Comparison of Built Environment Design Elements between the Higher and Lower Occupancy GSO CCRC Groups

	<i>Group 1 (Lower)</i>			<i>Group 2 (Higher)</i>		
	<i>A</i>	<i>B</i>	<i>C</i>	<i>A</i>	<i>B</i>	<i>C</i>
Occupancy Rate (Mean)	92.9%			94.7%		
Occupancy Rate	92.4%	92.9%	93.5%	94.3%	94.3%	95.4%
Year Opened	1968	1993	1979	1980	1972	1913
Total Units	329	409	383	487	340	290
Independent Living_Units	194	251	180	261	170	163
Assisted Living_Units	52	71	48	97	46	12
Nursing Bed_Units	69	60	125	83	84	71
Dementia Care	O	O	O	O	O	O
Emergency Call System	O	O	O	O	O	O
Swimming Pool/Spa/Sauna	O	O	O	O	O	O
Transportation Available	O	O	O	O	O	O
Exercise Room or Programs	O	O	O	O	O	O
Cottage_Facility types	X	O	O	O	O	O
Villa / Townhome_Facility types	X	O	X	X	O	O
Apartment_Facility types	O	O	O	O	O	O

It is difficult to identify notable differences in year opened [1], number of independent living units [3], number of assisted living units [4], number of nursing bed units [5], availability of facility building types in communities such as cottage or villa [11]. Because, in the above categories of built environmental characteristics, there is no clear regional difference between each paired CCRC groups (Table 4.2, 4.5, and 4.6).

However, it is clear that these two groups have different ranges of total residential units, particularly in RDU and Charlotte-Concord-Gastonia metropolitan areas (Table 4.2 and 4.6), except for GSO area (Table 4.3). In Table 4.2, Group 1 (“lower” occupancy) has total residential units up to 193, or more than 542. On the other hand, Group 2 (“higher” occupancy) has total

residential units ranging from 245 to 354. Additionally, in Table 4.4, Group 1 have total residential units more than 408. On the other hand, Group 2 has total residential units less than 369. As such, the range of total residential units, which is the only difference in the built environment between these CCRC groups, may contribute to obtaining higher occupancy rates.

Table 4.4. Comparison of Built Environment Design Elements between the Higher and Lower Occupancy Charlotte-Concord-Gastonia CCRC Groups

	<i>Group 1 (Lower)</i>		<i>Group 2 (Higher)</i>	
	<i>A</i>	<i>B</i>	<i>A</i>	<i>B</i>
Occupancy Rate (Mean)	91.7%		96.0%	
Occupancy Rate	90.6%	92.9%	93.5%	98.6%
Year Opened	1948	1988	1987	1999
Total Units	456	408	336	369
Independent Living_Units	248	276	251	310
Assisted Living_Units	108	90	25	4
Nursing Bed_Units	100	42	60	55
Dementia Care	O	O	O	O
Emergency Call System	O	O	O	O
Swimming Pool/Spa/Sauna	O	O	O	O
Transportation Available	O	O	O	O
Exercise Room or Programs	O	O	O	O
Cottage_Facility types	O	X	O	O
Villa / Townhome_Facility types	O	X	O	O
Apartment_Facility types	O	O	O	O

Occupancy Rates Impacting CCRC Revenues

This analysis shows that the difference in occupancy rates on average between Group 1 (“lower”) and Group 2 (“higher”) is 8.7% in RDU and 4.8% in Charlotte-Concord-Gastonia metropolitan areas (Figure 4.3) (Table 4.3). By multiplying the *value of difference* by the *influence of the occupancy rate* (89.04%) on the CCRC revenue structure referenced in Chapter 4 (p. 71), the impact of the difference on occupancy rates can be estimated. These calculations indicate that the estimated impact of higher occupancy rates on the total CCRC revenue is approximately 7.7% and 4.2%. In other words, the “higher” occupancy CCRC group (Group 2 in

Table 4.2) in RDU with the specific range of total residential units from 245 to 354 generated 7.7% more revenue than the “lower” occupancy rate RDU groups (Group 1 in Table 4.2); the the “higher” occupancy CCRC group (Group 2 in Table 4.4) in Charlotte-Concord-Gastonia with the total residential units less than 369 generated 4.2% more revenue than the “lower” occupancy rate Charlotte-Concord-Gastonia groups.

Financially, this study makes the simplistic assumption that all residents of the “higher” occupancy rate CCRC groups (Group 2s in Table 4.2 and 4.6) pay the same monthly fees in themselves (Patient out-of-pocket “49.44%” in Table 4.1, 71); the average monthly fees of CCRCs in the CCRC groups are \$3,820 in RDU and \$3,477 in Charlotte-Concord-Gastonia areas (North Carolina Department of Insurance, 2017); the average monthly fees (\$3,820 in RDU and \$3,477 in Charlotte-Concord-Gastonia areas) can be divided by the percentage of 49.44% (Patient out-of-pocket in Table 4.1), then multiply the divided value ($\$3,820/0.4944 \approx \$7,726.54$ and $\$3,477/0.4944 \approx \$7,032.77$) by the influence of occupancy rate (89.04% in p.71). This established a possible revenue per occupied residential CCRC unit belonging to the “higher” CCRC group of \$ 6,879.71 ($\approx \$7,726.54*0.8904$) in RDU and \$6,261.98 ($\approx \$7,032.77*0.8904$) in Charlotte-Concord-Gastonia areas.

The average numbers of total residential units of CCRCs in the “higher occupancy” groups are 321 in RDU and 353 in Charlotte-Concord-Gastonia areas; the “higher occupancy” groups have 8.7% more occupancy rate in RDU and 4.8% more occupancy rate in Charlotte-Concord-Gastonia areas (Figure 4.8); the 8.7% of this 321 is approximately twenty-eight units and the 4.8% of 353 is approximately seventeen units. By multiplying the additional unit revenue of \$6,879.71 by twenty-eight units, the possible financial impact of higher occupancy rates per individual facility in the “higher occupancy” CCRC group is \$192,631.88 per month and \$2.31M

per year in RDU area, as well as \$106,453.66 per month and \$1.28M per year in Charlotte-Concord-Gastonia area. This suggests a significant financial impact is possible by focusing on particular total unit numbers of CCRCs.

Conclusion and Discussion

Conclusion

This research began with an overarching question of how to better support the financial viability of CCRCs through the design of the built environment. By reviewing existing data relative to the viability and operation of CCRCs, the occupancy rate was identified as a probable indicator in determining whether a CCRC is financially stable. This research then used the perspective of Program Evaluation to explore relationships between three elements: the built environment, occupancy rate, and the financial stability of CCRCs. Targeting three major metropolitan areas of North Carolina, this study aimed to fundamentally connect the financial stability of CCRCs with specific built environmental elements. Methods included re-analyzing existing data as a research tool to support a foundation for evidence-based design. As a result, for centers with similar locations and supportive services in 2017, CCRCs with notably higher occupancy rates had a specific range of total residential units between 245 and 354 in the Raleigh-Durham-Chapel Hill and less than 369 in Charlotte-Concord-Gastonia metropolitan areas. This particular ranges of total unit number, in the context of the described conditions of location and provided services, was calculated to improve occupancy by 8.7% on average in RDU and 4.8% on average in Charlotte-Concord-Gastonia than the other CCRCs' average occupancy rates, which could translate to an increase of total revenue for a CCRC by 7.7%, or \$192,631.88 per month and \$2.31M per year in RDU, as well as 4.2%, or \$106,453.66 per month and \$1.28M per year in

Charlotte-Concord-Gastonia area. Given this, CCRC stakeholders, especially design practitioners, can be better informed when planning the scope of total residential units for future CCRCs.

Discussion

Because this research is exploratory, the sample is small and purposeful, which could be viewed as a limitation. This research cannot necessarily be generalized to another area, enhance the confidence of statistically analyzed outcomes, or claim that the number of total resident units directly influences the occupancy rate of CCRCs. However, because data were collected in the public reports including whole population of CCRCs from the North Carolina Department of Insurance, which are open sources and public data, this research can be replicated and findings confirmed. Future research should explore another state with the same research framework to better understand transferability. Additional studies should also use surveys and interviews to gather residents' opinions about what designed elements of the built environment provide the most satisfaction, leading to higher occupancy rates, particularly at the CCRCs identified in this sample. Overall, this research proposes a that the range of total residential units is a significant consideration for design practitioners in the CCRC industry to consider when designing for the continued stability and operation of CCRCs.

Moreover, the occupancy rate is only one factor for fiscal viability. In addition to the occupancy rate, according to Chapter 3 (p. 45) and Curran (2018), there are six successful factor of CCRCs in the market such as: *Superior financial management and debt management, Being familiar with local tastes and preferences, Ability to attract local support/patronage, Realize operating efficiencies, Ability to provide a broad spectrum of care, and Ability to obtain regulatory approvals.* These factors are also factors for fiscal viability. But, as the Capter 3

described (p. 45), these factors are effective after achieving occupation of or for occupying CCRCs at least. That is why this exploration sets a relationship between the built environmental elements with the occupancy rate. Of course, after a certain level of occupancy rate has been achieved, the six factors above may work more finely and have more impact on fiscal viability than the occupancy rate. However, this study is valuable in order to increase the fundamental financial validity through the increased occupancy rate before dealing with financial effectiveness under financial strategy of the six factors.

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CHAPTER 5: Conclusion

Conclusion

This research was conducted in three phases. First, archival data was reviewed addressing formalized CCRC rules and regulations amended by the state governments, facility guidelines and POEs published by professional organizations such as the AIA, and published literature from Taylor and Francis. As a result, Chapter 2 identified two common concerns for supporting CCRCs. The primary issue that emerged from the data is meaningfully supporting the continuity of CCRCs in providing life long care service to residents by avoiding permanently closing, such as bankruptcy; this is a fundamental concern of whether CCRCs can provide senior-specialized living environments corresponding to the needs of the elderly. The secondary issue is developing a sense of community in CCRCs. The development of a sense of community is necessary to synthesize overall needs among residents and convey those needs to their CCRC management. These two issues, avoiding closure and enhancing the community, need to be addressed not only for CCRC providers but also for CCRC residents.

Chapter 3, following the findings of Chapter 2, aimed to better understand how to support the continuing operation of CCRCs by mitigating financial challenges in the CCRC development and maintenance processes identified in Chapter 2. This chapter explored relationships between financial and design aspects of CCRCs, specifically using North Carolina CCRCs as a purposive sample. As a result, Chapter 3 indicated that CCRCs with unfavorable financial health are less aligned with the current trends in North Carolina CCRC development in terms of 1) location, 2) community scale, 3) building types of CCRCs, 4) provided levels of care units and services, 5) provided supportive services, and 6) presence of residents on the executive board. In other words, if a CCRC is developed or maintained according to recent trends such as 1) locating in

the major metropolitan areas, 2) developing a small CCRC, 3) apartment centered building types, 4) providing all levels of care units with Dementia care, 5) providing water activity programs (swimming pool, spa, and sauna), and 6) inviting residents to the CCRC board of directors, the CCRC may reduce the likelihood of a financially unfavorable status, possibly leading to bankruptcy. Additionally, the presence of a resident on the CCRC executive board is both one of the recent trends as well as the differences between CCRCs with desirable or undesirable financial health; residents on a board support the purpose of the secondary issue, conveying synthesized residents' opinions to the CCRC management organization.

Lastly, Chapter 4 focused on exploring how to improve the financial viability of CCRCs, reaching out to the stability of CCRCs through the design of the built environment. Based on the results of Chapter 3, this paper explored North Carolina CCRCs located in metropolitan areas with the same configurations of supportive services provided, including having resident members on the CCRC executive board. This exploration suggests that Raleigh-Durham (RDU) and Charlotte-Concord-Gastonia CCRC groups with higher occupancy rates than average may have a specific range of total residential units from 245 to 354 in RDU or less than 369 in Charlotte-Concord-Gastonia. In contrast, the other RDU and Charlotte-Concord-Gastonia CCRC groups with lower occupancy rates than average may have total residential units either less than 245 or more than 354 in RDU or more than 369 in Charlotte-Concord-Gastonia. Therefore, it could be worth considering the total residential units of CCRC developments as a possible factor in design criteria for future CCRCs in North Carolina.

Consequently, by synthesizing all the findings of the three Chapters above, a set of guidelines is proposed for future CCRC development and maintenance in North Carolina:

- 1) CCRC stakeholders and design practitioners are worth to understand what the current CCRC development trends are and what specific trends could be applied for their works in their decision-making process.
- 2) It may be better to align the CCRC development and maintenance projects with the current trends for the reduced possibility for undesirable financial health; the current trends include: 1) locating in the major metropolitan areas, 2) developing a small CCRC, 3) apartment centered building types, 4) providing all levels of care units with Dementia care, 5) providing water activity programs (swimming pool, spa, and sauna), and 6) inviting residents to the CCRC board of directors.
- 3) If a CCRC meets current trends in development in terms of location and supportive services, having a proper range of total residential units could be a key factor to reach out to the stability of the CCRCs by improving the viability of CCRCs.
- 4) A proposed CCRC model for future development includes these built environment criteria and supportive services:
 - a. Locating in a major metropolitan area;
 - b. Having a smaller community scale at the beginning but, after arriving appropriate occupancy level between 90% to 95%, expanding the total residential units to between 245 and 354 in RDU and 369 in Charlotte-Concord-Gastonia;
 - c. Providing all levels of care (Independent Living, Assisted Living, and Nursing Home) including Dementia care;
 - d. Providing supportive services including a swimming pool, spa, or sauna;
 - e. Inviting residents to serve as a member of the executive board.

Limitations

This research hopes to suggest prioritized needs for supporting the stability of CCRCs and developing a sense of community through exploring North Carolina CCRCs. This dissertation proposes a CCRC development and maintenance guideline for the stability of CCRCs, but it is limited to address developing a sense of community. In detail, the results of Chapter 3 and 4 cover the governmental sector's concern on the sense of community by stating "Inviting residents to serve as a member of the CCRC executive board" as a recommendable element for CCRC development and maintenance, which the element is a way to support the sense of community from governmental approach. However, there is a remained issue between professional and academy sectors on layouts of CCRC built environment because of the apartment centered building types in the current CCRC development trend; by developing CCRCs with apartment buildings, many CCRCs have allocated residents to different floors based on their level of service, which is the exact concern "the residents are separated environmentally and socially" in practice; on the other hand, by sharing the first floor for accesses in apartment buildings of CCRCs, there is an increased possibility the residents at different levels of care services may encounter each other, which is the exact concern of residents' depression, when a more able-bodied resident mingle with less-able residents, in the academy. As a result, the suggested optimized CCRC model (p. 96) of this dissertation may be able to support the stability of CCRCs financially, but there is a possibility that the suggestion could aggravate developing a sense of community with the aspects of practice and academy sectors.

Also, this research is limited based on only published archives within a specific period, such as NCDOI reports from 2006 to 2017. Furthermore, this dissertation does not address whether residents prefer the identified trends in CCRC development. Additionally, it is difficult

to apply this research outcome in the detailed design process since the outcome suggests an optimized CCRC model guiding design criteria with a holistic perspective instead of a specific part of CCRC. To further support this dissertation, additional research should be conducted, including field research at the RDU CCRCs identified as having desirable financial health. Additional field research should be done investigating resident satisfaction regarding the built environment and supportive services of CCRCs, specifically addressing the impact of the built environment and supportive services on the resident satisfaction, and how these designed environments may impact the occupancy levels of CCRCs. As a result, this future research will be beneficial to architects and interior designers practicing in the senior living market. Furthermore, the research can be a link between research-based and studio-based classes in Architecture and Interior design programs to provide for better-designed residences for the senior population.

Significance

Even though the limitations of this dissertation above, this dissertation is significant as exploratory research in this CCRC research field with limited resources. Chapter 3 and 4 have a small number of CCRC samples and no statistically significant findings, but these chapters are basement to generate hypotheses. Also, this study increases opportunities for design practitioners to design more supportive and satisfactory CCRCs for stakeholders. Design practitioners can be a driving force for the increasing development and maintenance of CCRCs in demand in the United States, particularly in North Carolina. Especially the design practitioners can recognize what specific trend could be applied for their projects and provide a persuasive reference to their clients with economic value. Also, developers may reduce financial risks with the proposed CCRC model. Moreover, NCDOI officers can reference this dissertation to support licensed

CCRCs or develop a North Carolina CCRC development and maintenance guideline. For example, the officers may be able to add an element “Inviting residents to serve as a member of the CCRC executive board” to their license regulation, which the element has been regulated in other states already such as California, Connecticut, Massachusetts, and New York (Table 2.1). Additionally, if the CCRCs can keep the stability of the CCRCs, residents can take benefits from secure life long care services in their CCRCs until they pass away, without the need to move to another facility. As a result, this research can be beneficial to the senior living industry, both in terms of developers, designers, and residents.