



The Business Opportunity of Insulated Concrete Form (ICF) Resilient Housing in the U.S. Middle-Market: Definition, Challenges and New Opportunities

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Dissertation written under the supervision of Rute Xavier

Dissertation submitted in partial fulfilment of requirements for the MSc in
International Management - Entrepreneurship, at Universidade Católica
Portuguesa and for the MSc in International Business at Smith School of
Business, Queen's University,
May 28th, 2026.

Abstract

Title: The Business Opportunity of Insulated Concrete Form (ICF) Resilient Housing in the U.S. Middle-Market: Definition, Challenges and New Opportunities

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This thesis examines the business opportunity for a mid-market Insulated Concrete Form (ICF) single-family home developer in the U.S., particularly in high-risk climate zones, using Alabama's Mobile and Baldwin Counties as an entry point. Despite wood-frame construction's continued market dominance, constituting 94% of new U.S. single-family homes in 2024, ICF offers superior durability, energy efficiency, weather resilience, and lower long-term ownership costs. These advantages are significant differentiating factors amplified by the escalating homeowners' insurance crisis and climate-driven disasters causing \$64.8 billion USD in damages annually.

Through a mixed-methods approach, the study combines secondary data analysis with seven stakeholder interviews throughout the ICF value chain. Findings confirm three primary barriers to voluntary market adoption of ICF: (1) a persistent focus on upfront cost rather than lifetime value, (2) low awareness of ICF and its benefits, and (3) industry resistance rooted in compatibility and entrenched wood-frame market systems. These leave a clear gap in the high-middle market for ICF, particularly among equity-rich repeat home buyers and downsizing retirees.

Applying Blue Ocean Strategy tools, the research proposes "Resilient Bungalows", a differentiated build-to-order home development model focused on creating new demand by addressing education barriers, lowering perceived risk, and demonstrating lower monthly ownership costs while aligning with small-developer realities and state resilience incentives. This study demonstrates a business opportunity to grow ICF voluntary adoption, turning climate vulnerability into profitable, sustainable growth.

Keywords: Insulated Concrete Form (ICF), Blue Ocean Strategy, resilient housing, middle-market real estate, climate adaptation, adoption barriers, business model innovation

Resumo

Título: A Oportunidade de Negócio de Habitação Resiliente em Formas de Betão Isoladas (ICF) no Mercado Intermédio dos EUA: Definição, Desafios e Novas Oportunidades

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Esta tese examina a oportunidade de negócio para habitação unifamiliar em betão isolado (ICF) no segmento médio do mercado nos Estados Unidos, em zonas de elevado risco climático, utilizando os condados de Mobile e Baldwin, no Alabama, como ponto de entrada. Apesar do domínio da construção em madeira - representando 94% das novas habitações unifamiliares em 2024 - o ICF oferece durabilidade, eficiência energética, resiliência climática e menores custos de propriedade a longo prazo. Estas tornam-se fatores diferenciadores relevantes face à crise dos seguros habitacionais e aos desastres climáticos, responsáveis por perdas anuais de 64,8 Bn€.

O estudo combina análise de dados secundários com sete entrevistas a stakeholders ao longo da cadeia de valor do ICF. Os resultados identificam três principais barreiras à adoção: (1) foco no custo inicial em detrimento do valor de longo prazo, (2) baixo nível de conhecimento sobre o ICF e os seus benefícios, e (3) resistência do setor, associada à compatibilidade e à predominância dos sistemas baseados em madeira. Estas barreiras evidenciam uma lacuna no segmento médio-alto, sobretudo compradores recorrentes com capital próprio e reformados. Com base na Blue Ocean Strategy, a investigação propõe o modelo “Resilient Bungalows”, orientado para criação de nova procura através da redução de barreiras informacionais, mitigação do risco e demonstração de menores custos mensais de propriedade, alinhando-se com a realidade de pequenos promotores e incentivos estatais à resiliência.

O estudo evidencia uma oportunidade de negócio para expandir a adoção do ICF, transformando vulnerabilidade climática em crescimento sustentável e rentável.

Palavras-chave: Formas Isoladas de Betão (ICF), Blue Ocean Strategy, habitação resiliente, mercado imobiliário intermédio, adaptação climática, barreiras à adoção, inovação de modelos de negócio

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1. Introduction

Nationwide traditional wood-frame construction continues to dominate the North American residential housing market, constituting 94% of new United States single-family builds completed in 2024 (U.S. Census Bureau, 2024). Accordingly, high-risk climate areas in the United States, particularly along “Dixie Alley” and “Tornado Alley” (Gagan et al., 2010) experience consistent seasonal devastation, which causes a U.S. annual average of \$64.8 billion USD in damages (NOAA National Centers for Environmental Information, 2025). What has emerged is a “looming home insurability crisis” (Moore, 2026), as increases in housing values, weather events, and insurance claim amounts from climate-influenced natural disasters have caused homeowners insurance costs to grow 24% between 2021 and 2024, 11% higher than the corresponding inflation (Cornelissen et al., 2025). Despite many states implementing building code requirements for wind resistance and weather resilience, insurance companies continue to increase rates to offset rising risk and are refusing coverage of certain U.S. areas deemed “uninsurable”, with some California communities facing over 50% uninsurability (Moore, 2026). Nationwide U.S. states are facing the danger of communities becoming unrecoverable and unaffordable, as overburdened consumers are pressured into accepting last-resort state insurers, unregulated insurers, lower quality coverage, or foregoing home insurance altogether (Cornelissen et al., 2025).

Despite evidence proving Insulated Concrete Form (ICF) houses have superior strength and durability (Federal Emergency Management Agency, 2021), vast energy savings (Ghosh & Bigelow, 2025), and reduced life cycle emissions compared to wood-frame (Ochsendorf et al., 2011), market penetration remains extremely shallow as buyers and builders default to traditional wood-frame builds (U.S. Census Bureau, 2024).

Therefore the core management issue is one of adoption: how to increase ICF's market share from a niche solution to the mainstream voluntary market across the rest of America's high-risk zones. The proposed solution is a mid-market single-family home developer focused on safety benefits, long-term consumer ROI, and capitalization on rebuilding markets.

To narrow the scope, this paper will propose a market analysis and business strategies for one U.S. state with high-risk weather, low concrete housing adoption, and momentum to change, with the intention of future growth to similar markets. As an entry point, Alabama stands out with the 8th highest average state insurance premium (Cornelissen et al., 2025), low ICF competition (Baldwin County Home Builders Association, n.d.), and proven grant programs

and insurance regulation to incentivize resilient home construction (Alabama Department of Insurance & Center for Risk and Insurance Research, University of Alabama, 2025).

Motivation

The historical advantages of wood-frame housing in North America are eroding; tariffs and supply chain issues continue to disrupt lumber prices (Lamichhane et al., 2025), superior insulating factors are achieved with other building materials therefore saving energy (Ghosh & Bigelow, 2025), and climate resilience is becoming a significant issue for insurers, states, and buyers. Insulated concrete form housing solves many of these issues, but industry is slow and resistant to adapting from the overwhelming predominance of wood-frame house construction.

Objectives

The research goal of this paper is to identify and support a business opportunity for a mid-market ICF developer in disaster-prone areas of the United States and propose relevant entry strategies to increase free market penetration in a specific state. The objective is to achieve an understanding of ICF potential in a disaster-prone area to establish a basis for an ICF developer business proposal.

Research Questions

The following section provides a comprehensive overview of what quantitative and qualitative proposed research questions will be used to analyze ICF market potential and address the central thesis: *Is there a market opportunity in high-risk climate areas of the United States for a mid-market ICF single-family home developer and how can it be addressed?* This thesis targets primary and secondary research for practical application through three research questions.

- RQ1: How can the construction and real-estate market in high-risk areas be characterized and what are the main barriers to ICF adoption for home buyers and builders?
- RQ2: What gaps exist in the current ICF development market and what innovative strategies could a new entrant use to claim market share?
- RQ3: How can an ICF developer effectively enter the market while establishing substantial differentiation for long-term growth?

Structure of the Thesis

This thesis analyzes the market potential for a mid-market ICF single-family home developer in climate disaster-prone Alabama. After introducing the market problem and relevant research questions, the literature review presents the necessary definitions and theoretical foundation for research and analysis. The methodology explains the application of the theoretical foundations used to gather primary and secondary data, followed by the analysis of data collection and conclusions drawn.

2. Literature Review

2.1 Definition of ICF

Insulated Concrete Form (ICF) is a method of constructing concrete homes by using hollow Lego®-like Expanded Polystyrene (EPS) insulating blocks to build the structure's outer frame, filling the blocks with rebar and concrete, and leaving the EPS as the outer layer of the frame, as seen in Appendix A, Figure 1. This creates an extra insulated layer while reusing material, as opposed to conventional concrete wall assembly methods which use disposable formwork materials, typically wood, making ICF more sustainable (Ghosh & Bigelow, 2025). ICF is also superior to wood-frame housing with substantial energy savings, reduced life cycle emissions, and a vastly stronger structure due to its monolithic form (Federal Emergency Management Agency, 2021), resulting in less long-term maintenance and increased weather resilience, therefore lower insurance costs. The benefits of ICF however, have not been sufficient to drive widespread change in the voluntary market as the U.S. Census Bureau data (2024) shows only a 5% national adoption rate of concrete homes.

This literature review focuses on theories and methods to analyze the real estate market, identify gaps and create strategies to increase adoption of ICF as an innovative product from a business management perspective.

2.2. Market Analysis

Modern marketing management strategies have increasingly become pivotal to overall organizational decision-making and success as technology enables rich data-driven analysis of consumer markets for long-term strategic planning, as well as short-term tactical planning. Academic literature indicates that effective market planning is approached through market segmentation, targeting, and positioning (STP) strategies (Lestari, 2023), therefore the market analysis of this thesis aims to follow a similar approach.

2.2.1. Customer Segmentation and Targeting

Market segmentation allows an organization to tailor their strategy by dividing a market into distinct customer groups with similar needs, characteristics, or behaviours. This involves accounting for consumer variables within the criteria categories of demographic, psychographic, geographic, and increasingly includes behavioural segmentation based on consumer purchasing patterns (Lestari, 2023).

Thorough and practical guides for organizational segmentation identify two approaches to the segmentation process: *a posteriori* (cluster-based or data-driven) and *a priori* (commonsense

or convenience-group) (Dolnicar et al., 2018). *A priori* segmentation involves using a single segmentation variable, for example age, to create a targetable market segment, such as age groups, without the benefit of exploratory primary market research. This approach relies on intuition, secondary data analysis, and previously existing segments to delineate consumer groups according to commonsense and convenience for serving those groups (e.g. presuming that age groups have many similarities in terms of buying behaviour, culture, and market channels, therefore it will be efficient to select age as a segmentation variable).

The *a posteriori* or data-driven segmentation approach uses multiple pieces of information to create a multidimensional understanding of a consumer segment through data collection and identifying market segments by clusters of data-points. This can be observed with a question such as “when booking a flight online, do you care about: convenience, value for money, speed, ability to compare fares” (Dolnicar et al., 2018), using data analysis to identify common themes and create segments.

Both *a priori* and *a posteriori* are extreme opposite ends of approaching segmentation, therefore in reality a combination of both are used in researching and targeting market segments.

2.2.2. Diffusion of Innovation and Adoption Barriers

Product development is a crucial aspect of strategic marketing management, with growing importance on co-creation and open innovation, particularly as consumer trends evolve to focus on experience and personalization, leading marketing management strategy to remain extremely consumer-centred (Lestari, 2023). Accordingly, the customer journey (Lemon & Verhoef, 2016) has been researched extensively, however importance must also be placed on industry-side adoption barriers that make innovative products desirable for trial and production. The diffusion of innovation (DOI) theory focuses on organizational adoption of technologies based on perceived features and the organization’s decision-making process (García-Avilés, 2020). In the originating literature of DOI by Rogers (2003), he identifies five attributes of innovations contributing to their rate of adoption: 1) the innovation’s relative advantage in comparison to existing solutions, 2) compatibility with the organization’s existing values, past experiences, and needs, 3) complexity to implement, 4) trialability, and 5) observability of results from innovation development within the organization and in competitors. It is noted that it is the subjective view (of organizational individuals) of these five attributes that accurately predict the rate of adoption for innovations, not the objective reality (Lestari, 2023). These five attributes are then evaluated throughout the individual’s decision-making process, which

Rogers (2003) conceptualizes in the following five step process: knowledge, persuasion, decision, implementation, and confirmation.

2.2.3 Criticisms of Traditional Adoption Models and Segmentation

Collaborative product development and innovation has been a major focus of modern marketing management as it adapts to more dynamically include consumer contributions and serve customer desires (Lestari, 2023), reducing some of the DOI adoption barriers of companies. However, with the digital transformation of marketing, companies can rely too heavily on recent data-driven consumer insights trading short-term success for long-term vision and brand image (Dalsace et al., 2025). There remains a disconnect between innovative design and the reality of short-term profit-motivated, risk-averse shareholders (Kornelakis & Petrakaki, 2025) in addressing potential disruptive *Blue Ocean* opportunities.

2.3. Business Model Innovation

In 1996, Michael Porter commented on the important distinction between operational effectiveness and strategic positioning, stating that “A company can outperform rivals only if it can establish a difference that it can preserve” (Porter, 1996). This highlighted a movement from a sustained period of business strategy anchored in a competitive mindset (Kim & Mauborgne, 2005) towards “value innovation” (Leavy, 2018) through long-term differentiation as industrial supply-side driven strategy ceased to be a viable option (Teece, 2010). What followed since 1996 is a dramatic increase in research on business models, open innovation, and dynamic capabilities, (Foss & Saebi, 2017), and more recently, Business Model Innovation (BMI). Defined by Foss & Saebi (2017) as “designed, novel, nontrivial changes to the key elements of a firm’s business model and/or the architecture linking these elements”, BMI research varies in approach and theoretical groundings as causal relations are difficult to define, however one of the most widely accepted and comprehensive theories for creating a sustained unique value proposition through BMI remains the Blue Ocean Strategy.

2.3.1. Blue Ocean Strategy

The Blue Ocean Strategy (Kim & Mauborgne, 2005) posits that the market universe exists as two oceans: a red ocean containing existing competition, industry boundaries, and rules, labelled the known market space, and as a blue ocean representing industries not currently in existence, or labelled the unknown market space.

In the red ocean companies compete for market share of existing demand through low cost, differentiation or focus. As the red ocean becomes crowded, prospects for profit and growth

are reduced, products become less distinguishable and commodity-like, and businesses increasingly engage in cutthroat competition reducing profit margins. On the other hand, the blue ocean is defined as the untapped market space, where competition is irrelevant because the rules and strategies are undefined and the game is entirely new. It requires disruptive innovation from a *reconstructionist view*; ignoring competition and existing market structure to reorder existing elements from different markets and create a new market space with new demand generation. However, this also involves aligning the whole company's utility, price, and cost activities to drive down costs while increasing value for customers. This internal and external change allows blue ocean creation to be a sustainable strategy with long-term profitability over red ocean differentiation.

The blue ocean strategy is guided by two analysis tools and one framework. The first analysis tool is a *strategy canvas*, which visually maps the factors that any given industry competes upon on the horizontal axis, while the vertical axis represents the offering level that buyers receive from each factor. This is meant to give a full-picture sense of "the current state of play, the assumptions the industry acts on and the degree of competitive convergence across existing players" (Leavy, 2018), mapping the strategic profiles and cost structure of your biggest competitors and yourself. The strategic profile is visualized with a *value curve*, developed by connecting the points of offering. In practice, the strategy canvas should measure five to twelve competitive factors and show the strategic profile of the top one to three competitors (Leavy, 2018)

The *Four Actions Framework* and the *Eliminate-Reduce-Raise-Create Grid* are then used to ask and answer how a company can develop and enact a blue ocean strategy while creating a new value curve. The four actions framework first asks which industry competing factors could be eliminated because they no longer add value. Secondly, to consider which factors have been over-designed while competing and can be reduced at minimal reduction in value added. Third, it must be questioned what compromises consumers are forced to make and which factors should be raised well above industry standard. And finally, which factors can be created which the industry has never offered. The eliminate-reduce-raise-create grid then requires actionable answers to these questions which will be plotted on the strategy canvas to create a new value curve.

The blue ocean strategy book provides guidelines for reading and developing a good value curve including three key characteristics: value curve *focus* on exceeding certain factors but not all, value curve *divergence* from competitors, and a clear *tagline* of the strategic profile expressing what the brand offers.

In 2017, Kim and Mauborgne expanded on practical application of blue ocean strategy with their book *Blue Ocean Shift*, which presented a systematic five-step process for implementing new market-creation strategies (Leavy, 2018), including frameworks such as the *Pioneer-Migrator-Settler Map*, *The Buyer Utility Map*, *The Three Tiers of Non-Customers*, *The Six Paths Framework*, and finalizing decision guidelines, in addition to the aforementioned strategy canvas, four-actions framework and eliminate-reduce-raise-create grid. All-together the process provides a comprehensive and actionable path forward.

2.4. Addressing the Market

2.4.1. TAM-SAM-SOM

The *TAM-SAM-SOM* model is a tool used to estimate the size of potential markets for a product, ultimately for the purpose of creating financial projections and estimating future market share. This tool addresses three key markets: the *Total Addressable Market (TAM)*, the *Total Serviceable Market (SAM)*, and the *Serviceable Obtainable Market (SOM)*, in either a “top-down” or a “bottom-up” approach (York, 2018).

The TAM is the broadest figure capturing all potential customers that exist for the chosen product. The SAM, a smaller portion of the TAM, is an estimate of how many customers exist within your realistic business boundaries, particularly geography and target market. Finally, the SOM is the actual portion of the SAM that the business could capture in the near-term, given competition and adoption rates.

Approaching TAM-SAM-SOM top-down requires using secondary market data, such as industry reports, narrowed by your product and limitations, followed by percentage-based assumptions to estimate market sizes. However, this approach will be less precise and can overlook certain aspects and nuances of the market. Conversely, the bottom-up approach uses primary data from consumers (such as pricing, sales metrics and conversion rates) and segmentation research applied to market size, offering a more defensible, data-driven approach.

2.4.2. Addressing the Real Estate Market

By using customer segmentation, blue ocean innovative differentiation, and assessing market size by customer needs, companies can best assess how new products can create new sustained demand outside the competitive marketplace for long-term profitability. However, consumer market companies favour competing in red ocean markets (Kim & Mauborgne, 2005), with supply-driven differentiation, particularly those of mature, high-investment industries such as

real estate (Tilford, 2009), due to adoption barriers and high risk perception (García-Avilés, 2020). By analyzing a combination of consumer demand segmentation, paths to minimizing industry adoption barriers, and blue ocean opportunities, projected markets of innovative real estate products like ICF can be realized.

3. Methodology

This study used a mixed methods approach, analyzing primary and secondary data collected through applicable theories to best answer the thesis research questions. The secondary data research was focused on *a priori* customer segmentation and defining the existing real estate market for demand-side comprehension through quantitative and qualitative data. The primary data research was concentrated on *a posteriori* qualitative analysis of industry segmentation and adoption rates of ICF construction.

3.1. Secondary Data Research

To evaluate the demand-side of the real estate market *a priori* customer segmentation took place, with secondary data collected on three classic criteria categories explained by Dolnicar et al., 2018: demographic, geographic, and behavioural.

First, a market descriptive analysis was performed with public secondary data to assess demographic and geographic criteria. Using databases such as Statista, the U.S. Census Bureau housing statistics, Alabama state insurance and building-permit data, NOAA disaster-frequency reports, and industry reports (Mordor Intelligence, 2026; Cornelissen et al., 2025), a TAM-SAM-SOM top-down approach (York, 2018) was used to calculate the Total Addressable Market (TAM), Serviceable Addressable Market (SAM) and Serviceable Obtainable Market (SOM). Market size was expressed both in number of potential single-family homes and in USD value, with clear assumptions stated for each step (e.g., Alabama households in targeted high-risk zones, average home value, ICF price premium). This provided a defensible estimate of market potential and serves as the quantitative foundation for customer targeting in RQ1.

Qualitative analysis followed to conduct behavioural segmentation. Secondary sources were assessed to identify behavioural patterns and trends in new single-family home buying, that would later inform the Blue Ocean Eliminate-Reduce-Raise-Create Grid. Then, a coded-review matrix was used to extract ten industry competitive factors important to single-family home buyers and builders. Coding analysis used techniques from Saldaña (2013), specifically first-cycle and second-cycle coding, in conjunction with thematic analysis guidelines from Braun and Clarke (2006) to define and name key themes. This review used key industry resources including ICF Builder Magazine, academic literature and statistical sources on consumer preferences, and industry reports. Industry competitive factors were identified and extracted in continuity with Blue Ocean descriptors (Kim & Mauborgne, 2005, 2017) particularly to name “the factors the industry currently competes on in products, service, and

delivery; and what customers receive from the existing competitive offerings on the market”. These competitive factors were used for primary data research, and later the creation of a Blue Ocean Strategy Canvas.

The integration of quantitative TAM-SAM-SOM outputs with the qualitative competitive-factor matrix produced the market characterisation required for RQ1 and directly informed the Blue Ocean Strategy tools used in later assessment.

3.2. Primary Data Research

To evaluate the supply-side of real estate, the study identified and confirmed industry adoption barriers and benefits of ICF construction through structured qualitative interviews. These interviews were conducted with key industry stakeholders in the ICF single-family home value chain.

A geographic proximity strategy was used to target and capture diverse perspectives throughout the ICF value chain in the U.S. Census Bureau’s *South* defined region (Appendix B, Figure B1). Targeted participants included stakeholders of businesses that did ICF general contracting, subcontracting, ICF material suppliers, distributors, association members, and real estate agents operating in Alabama or comparable high-risk U.S. markets. Referrals and connections from interviewees resulted in participants from alternative North American markets (particularly Ontario, Canada), but maintain relevance as a similar wood-frame dominated construction market, with ICF present as a high-end niche solution, per secondary data and interview responses (Journey et al., 2022).

Given the constrained research timeline and resources of this study, seven interviews were planned and conducted, which proved sufficient to achieve data saturation and ensured representation from both ICF-experienced and wood-frame experienced stakeholders. Interviews were between 30 and 100 minutes, providing detailed experienced perspectives on ICF in the market, and were hosted on Zoom, which allowed for recording and transcription, with participants permission.

Participants were sourced from professional networking, LinkedIn outreach, direct company website contact, and the ICF Hub Builder Directory (n.d.). Interview questions were developed from two frameworks used for analysis: the DOI five rate of adoption attributes framed from the stakeholder perspective and the ten industry competitive factors for the preliminary blue ocean strategy canvas.

The interview questions for primary data analysis were organized into four sections, presented in Appendix C. The first section defined the background and experience of

interviewees, particularly regarding their experience with ICF and their typical project homes, which helped categorize the market. The second section addressed diffusion of innovation factors directly, asking for the stakeholder's perspective on how they see ICF being adopted in the market. The third section identified the market value curve differences on competitive factors between the wood-frame dominated market and the ICF market, while questioning how demand and supply prioritized these factors. Finally, the fourth section explored market demand and a stakeholder perspective of consumer priorities, as well as identifying potential positioning opportunities.

Data analysis used structured coding and thematic analysis to identify recurring themes and generate conclusions on industry perspectives of ICF adoption. Following the qualitative research process of Braun and Clarke (2006), responses were first recorded and transcribed corresponding to the planned questions: either a DOI attribute or blue ocean competitive factor. This was followed by a deductive coding analysis using first-cycle coding descriptors including In Vivo, descriptive, process, and emotions/value (Saldaña, 2013), followed by second-cycle coding deduction which created 5 major categories. These were used to create answers for RQ1, RQ2 and RQ3 with each theme defined through a detailed analysis using the guidelines of Braun and Clarke (2006). Participant metadata is presented in Section 4.2.1. and the full interview guide is in Appendix C.

4. Analysis and Findings

4.1. Defining the Real Estate Market with Secondary Data

A crucial directive for any business to establish strategic positioning is to understand who their customer is and what the customer desires. Traditionally, residential real estate takes a supply-side analysis using market studies to support speculative housing developments, with pre-defined geography and existing supply the primary focus, and basic demographic information and macroeconomic factors in secondary consideration (Tilford, 2009). Though this is a valid method for ensuring absorption by proving a growing market, it is seldom accompanied by the recommended demand-side *marketability study*, which seeks to maximize the competitive position of the property by segmenting customers into groups with similar needs and preferences, providing product recommendations on appropriate features, amenities, and pricing. This study used both supply-side and demand-side approaches to create an intersection of potential gaps in the middle market.

4.1.1. TAM-SAM-SOM Market Definition

A potential business venture must quantitatively define their consumer base to create a realistic and profitable financial forecast. For many new opportunities, revenue is estimated using the TAM-SAM-SOM method in conjunction with a series of pre-determined assumptions and segmentations that funnel down to a targetable market. This study presents and explains a series of filters used to derive a serviceable obtainable market (SOM) specific to disaster-prone Alabama, but acknowledges that many obtainable markets exist with slight filter adjustments.

4.1.1.1. Total Addressable Market (TAM)

The total addressable market (TAM) exists as the broadest figure, representing all potential consumers for the product. According to U.S. Census Bureau data, in 2024 there were a total of 1,019,000 new single-family homes constructed in the U.S., of which 94% were wood-framed and 5% were concrete framed, however the entire figure of new single-family home constructions will be considered the total addressable market.

The median price of a new single-family home in the U.S. was \$420,300 USD in 2024 (U.S. Census Bureau, 2025a) and recent industry articles estimate the premium of initial ICF construction cost to be approximately 3-8% over traditional framed houses (BlueGreen Building Concepts, 2024). Therefore an estimated TAM in USD would be:

$$\text{TAM} = 1,019,000 \text{ homes} * \$420,300 \text{ USD} * (((0.03+0.08)/2)+1)$$

$$\text{TAM} = 1,019,000 \text{ homes} * \$443,416.5 \text{ USD}$$

$$\text{TAM} = \$451,841,413,500 \text{ USD}$$

$$\text{TAM} = \$451.84\text{b USD}$$

4.1.1.2. Serviceable Addressable Market (SAM)

The serviceable addressable market (SAM) is considered the market that the projected business could reasonably reach given geographic and target market limitations. Among the U.S. South, as defined by U.S. Census Bureau (n.d.) in Appendix B, there were 591,000 single-family home completions in 2024, of which 9% were concrete framed, therefore approximately 53,190 concrete single-family homes. However, construction is highly segmented and local in nature (Joint Center for Housing Studies, 2022), limited geographically by the local network, and the distance workers are willing and profitably able to travel. Therefore focus will be placed on Mobile County, Alabama's highest risk coastal county (NOAA, 2025), and its neighbouring Baldwin County, which has lower climate risk but an adjacent and larger single-family home market. Although established local competitors may service more counties through multiple states along the coast (Force 5 Walls, n.d.), this requires adherence to varying state regulation, different permitting processes, and will not benefit from the robust state support established in Alabama (Alabama Department of Insurance & Center for Risk and Insurance Research, University of Alabama, 2025). Mobile County and Baldwin County show growing trends of single-family housing permits, indicating a healthy absorption rate, with 851 and 3,316 units respectively in 2023 (U.S. Census Bureau, 2025c). Therefore the serviceable addressable market can be estimated as:

$$\text{SAM} = (851 \text{ homes} + 3316 \text{ homes}) * (0.09 \text{ concrete-framed})$$

$$\text{SAM} = 375 \text{ concrete-framed homes}$$

The median price of a new single-family home in the U.S. south was \$376,200 USD in 2024 (U.S. Census Bureau, 2025a), plus the 3-8% ICF premium, this presented a market capital value of:

$$\text{SAM} = 375 \text{ homes} * \$376,200 \text{ USD} * (((0.03+0.08)/2)+1)$$

$$\text{SAM} = \$148.83\text{m USD}$$

However, the median sale price of single-family homes in Baldwin County was approximately \$382,750 USD in December 2024 per industry reports (Redfin, 2026a) and only \$217,700 USD in Mobile County (Redfin, 2026b). This disparity was a result of local economies; Baldwin County a much bigger beneficiary of tourism (Pruitt, 2024), whereas Mobile County maintains a heavy industrial economy (U.S. Bureau of Labor Statistics,

2025)(Burnett, 2025). A weighted average of median house price for new single-family houses gave the following SAM:

$$\text{Median weighted average} = (3316/(851+3316)) * (\$382,750 \text{ USD}) + (851/(851+3316)) * (\$217,700 \text{ USD})$$

$$\text{Median weighted average} = (0.796) * (\$382,750 \text{ USD}) + (0.204) * (\$217,700 \text{ USD})$$

$$\text{Median weighted average} = \sim \$349,080 \text{ USD}$$

$$\text{SAM} = 375 \text{ homes} * \$349,080 \text{ USD} * (((0.03+0.08)/2)+1)$$

$$\text{SAM} = \$138.10\text{m USD}$$

4.1.1.3. Serviceable Obtainable Market (SOM)

Estimation of an obtainable market as a new entrant in a niche segment requires careful assessment and justified assumptions for accurate propositions. This was done by analyzing competition and using precedent growth rates.

ICF competition in the Mobile and Baldwin County area remains extremely low. There are only 4 ICF businesses listed in the county's Home Builders Association directory (Baldwin County Home Builders Association, n.d.), of which one concentrates on roofing, two have no websites and limited contact information, and one well established competitor exists which focuses on commercial projects and high-end custom homes, leaving a clear gap for a well-marketed, middle market competitor. This presents a blue ocean opportunity to obtain a large portion of the 9% concrete frame average in the U.S. South, but requires overcoming the hurdles of educating and converting consumers of the wood-frame dominant market.

Additionally, establishing and growing a business in real estate development requires established relationships, reliable supply chain, and large capital commitment, with most developers remaining small businesses. The median number of housing starts for a developer of the National Association of Home Builders (NAHB) in 2024 has plateaued at six homes (NAHB, 2025), and only 23% of developers start 26 or more homes.

Therefore the SOM was estimated bottom-up from a realistic developer capacity for a niche, new-entrant developer, with the intention of rapid expansion, but initially a small business heavily reliant on subcontractors and establishing repeatable processes (NAHB, 2025). Given the limited contractor availability and skilled labour-gap (Mordor Intelligence, 2026) initial growth was estimated to be slow and require investment in training for longer-term growth. Based on NAHB data (2025) a reasonable estimate of first-year production was three homes, half the small business median. With established processes, relationships, and trained staff, the business would be capable of the small business median of six homes in the second year

of operation. By the third year of operation, focus would be on refining processes and expanding full-time staff, with the goal of 10 homes for the year.

Accordingly:

$$SOM_1 = 3 \text{ homes} * \$349,080 \text{ USD} * (((0.03+0.08)/2)+1)$$

$$SOM_1 = \$1.10\text{m USD}$$

$$SOM_2 = 6 \text{ homes} * \$349,080 \text{ USD} * (((0.03+0.08)/2)+1)$$

$$SOM_2 = \$2.21\text{m USD}$$

$$SOM_3 = 10 \text{ homes} * \$349,080 \text{ USD} * (((0.03+0.08)/2)+1)$$

$$SOM_3 = \$3.68\text{m USD}$$

4.1.2. Demographic and Behavioural Market Definition

To create a demand-side understanding of consumers, demographic and behavioural segmentation from industry and statistical sources were used. The goal was to identify the industry competitive factors that matter the most to both consumers and builders, as appealing to buyers is important for charging a premium on middle-market products, while builders choose and budget for certain features in a supply-driven market. Blue Ocean Theory (Kim & Mauborgne, 2005, 2017) defined industry competitive factors as areas the competition is currently investing to “compete on its products, service and delivery; and what customers receive from the existing competitive offerings on the market”.

4.1.2.1 Consumer Segmentation

The home-buying process reveals many of the preferences modern consumers have when purchasing a home, especially as “finding the right property” was considered the most difficult step of the process by 55% of primary residence buyers in 2024 (National Association of Realtors, 2025c), while 88% of buyers purchased through a real estate agent or broker (National Association of Realtors, 2025b). The remaining quantity of home purchases were either directly from the previous owner at 7% or directly from the builder or builder’s agent at 5%.

When selecting a home the most important home features varied by consumer, but out of all surveyed U.S. homebuyers in 2024, 83% considered air conditioning important, 79% wanted a home within their initial budget, and the majority (55% to 73%) desired - from highest to lowest percentage - the preferred number of bedrooms, preferred square footage, private outdoor space, preferential layout, good potential to increase in value, preferred utilities, number of bathrooms, ample storage, off-street parking, a master bedroom, an energy

efficient home, spare bedroom, preferred kitchen style, and preferred finishes (Zillow, 2024b). Another important factor for consumers was choosing a neighbourhood, which was influenced by the quality of the neighbourhood for 59% of buyers, convenient to friends/family for 45% of buyers, overall affordability for 36% of buyers, and convenient to job for 34% of buyers (National Association of Realtors, 2025a). Additionally, climate events are a common concern with 73% of U.S. homebuyers considering at least one type of climate risk (ex. Flood, Wildfires) in 2024 (Zillow, 2024a).

Looking at homebuyer trends, “equity-rich, all-cash buyers are at an all-time high, while cash-strapped first-time buyers are at a record low” (Tracey, 2025), with first-time buyers at a record high median age of 40 and constituting just 21% of the market, an all-time low. Among repeat home buyers, 54% used proceeds from the sale of a previous home, held for an average of 11 years, and one in three are paying for their home purchase in full, avoiding financing all together. Repeat buyers had a median age of 62, with baby boomers between the ages of 60-78 being the largest share of home buyers at 42%, and sellers at 55% (National Association of Realtors, 2024). Meanwhile, the share of national new home purchases rose to 16%, while existing home purchases declined slightly to 84%. The percent distribution of single-family homes sold by sales price supports this aging demographic of buyers, with 18% of buyers in the south (Appendix B) buying in the \$400k-499k USD range, and 10% buying in the \$500k-599k USD Range (U.S. Census Bureau, 2025b), proving a sizeable upper-middle market. This points to a market where buying power is with those with existing market equity in homeownership. This is supported by aging U.S. homebuyer trends identified by Goodman & Zhu (2021), which are especially prevalent in Alabama, with aged 65 and older homeownership increasing dramatically, while homeownership aged younger than 65 sharply decreased, as identified by the Urban Institute (n.d.).

4.1.2.2. Industry Perspective

When looking at industry competitive factors from the company perspective, industry reports showed headwinds and tailwinds that ICF builders are navigating and using for positioning while competing in the market.

Tailwinds in North America, with approximate percentage impact on CAGR forecast, included stricter green-building codes and incentives (+1.2%), rising demand for energy-efficient mid/high-rise buildings (+1.0%), increased adoption of off-site and modular ICF systems (+0.8%), expansion of performance-linked green-finance programs (+0.6%), and FEMA resilience grants favouring ICF construction (+0.9%) (Mordor Intelligence, 2026).

Industry headwinds restricting ICF adoption, with approximate percentage impact on CAGR forecast, included higher upfront cost versus wood framing (-0.9%), limited contractor familiarity and skilled-labour gap (-0.7%), and volatile material supply and pricing risk (-0.5%) (Mordor Intelligence, 2026).

Other prominent industry sources such as ICF Builder Magazine publish relevant industry news, the experiences of builders, product research and educational resources. ICF Builder Magazine produced a comprehensive comparison chart between brands of ICF blocks which compares relevant performance data such as fire rating and sound attenuation, code approvals, and product support, including training and installation help, backed with unbiased technical data and specified benchmarks (ICF Builder Magazine, 2017). Specific comments on individual products show recurring consideration of product thermal insulation, versatility in product design and integration, cost-effectiveness, and long-term resilience.

Additionally, the ICF Builder Magazine website organizes articles into three main discussion categories: ICF costs, energy efficiency, and disaster resilience (ICF Builder Magazine, n.d), indicating high industry priority on these factors. These were confirmed as the main points of concern across interviewees, revealed as central and recurring themes with coded review analysis.

4.1.2.2. Industry Competitive Factors

To define industry competitive factors and position ICF according to Blue Ocean theory, first-cycle and second-cycle coding techniques from Saldaña (2013) were used in conjunction with thematic analysis outlined by Braun and Clarke (2006). Sources included ICF Builder Magazine, academic literature, statistical sources on consumers, and industry reports. The coded analysis matrix in Table 1 reveals the industry competitive factors for ICF in the residential housing market.

Table 1

Industry Competitive Factors Derived from Secondary Data

Source: Referenced in *Source* Column and Literature Bibliography

Competitive Factor	Source	First-Cycle Codes	Second-Cycle Theme/Summary	Evidence / Representative Excerpt
CF1: Initial Construction Cost (Price)	Ghosh & Bigelow (2025), ICF Builder Magazine (2020), Mordor	higher upfront cost, product premium, contingency mark-ups, premium, tax/	Persistent, but narrowing, upfront cost disadvantage	“ICF assemblies run 10%–15% above wood frames on a per-square-foot basis” (Mordor, 2026).

	(2026), Zillow (2024b)	program incentives		
CF2: Construction Speed/ Time on Site	BlueGreen Building Concepts (2024), ICF Builder Magazine (2020), Pulupula & Dua (2022)	Faster building time, short learning curve, multi-step completion	Faster when experienced and saves multiple steps in the complete building process.	“ICF looks slower at first... but we're completing structure AND insulation in one step” (BlueGreen Building Concepts, 2024).
CF3: Durability / Weather Resilience	Federal Emergency Management Agency (2021), Vue (2025), Zillow (2024a)	Proven disaster resilience, monolithic strength, climate resistance	Strongest ICF differentiator in high-risk zones	Case Study: Surviving Hurricane Michael (Vue, 2025)
CF4: Energy Efficiency & Operating Costs	Ghosh & Bigelow (2025), ICF Builder Magazine (2021)	Superior insulation, long-term savings, lower energy costs	Major long-term advantage for ICF	“the operating cost of an ICF house is also substantially less, leading to very long term cost savings.” ICF Builder Magazine (2021)
CF5: Homeowners Insurance Premiums and Insurability	Alabama DOI (2025), Cornelisson et al. (2025), Salvia (2021) (2024).	Decreased insurance risk, uninsurability, insurance discount, rising premiums	Major growing expense for homeowners. ICF decreases risk.	“Consumers in one-third of ZIP codes saw their premiums rise by more than 30 percent [between 2021 and 2024” (Cornelisson et al. 2025)
CF6: Maintenance Requirements Over Long-Term Periods (20-30 years)	Campbell (2024), Ghosh & Bigelow (2025), ICF Builder Magazine (2021), Ochsendorf et al. (2011),	Less maintenance, long-term cost savings, durable structure	Long-term cost advantage for ICF	“The durability of insulated concrete form walls means they are less likely to require repairs or rebuilding after normal wear and tear from the forces of nature, resulting in substantial cost savings over time.” (Campbell, 2024)
CF7: Aesthetic Appeal / Design Flexibility	ICF Builder Magazine (2020) (2021), Zillow (2024b)	Compatible with any style, versatile design, structural benefits	ICF is capable of and can exceed wood-frame designs	“Insulated concrete form construction can be adapted to virtually any residential or commercial project” (ICF Builder Magazine, 2020)
CF8: Regulatory/ Permitting Ease and Code Compliance	Alabama DOI (2025), Federal Emergency Management Agency (2021), Salvia (2021)	ICF code integration, lack of knowledge, exceeds code compliance	Growing acceptance as ICF exceeds most building codes, but not understood and fully integrated by all stakeholders (ex.	State support for resilient construction. “The difference between Fortified and Code construction demonstrates the important role of uniform code enforcement in building resilient

			Insurance companies).	communities” (Alabama DOI, 2025).
CF9: Supply-chain Reliability and Material Availability	Mordor (2026)	Pricing risk, volatile supply, limited distribution	ICF is not as prevalent a material as wood. Supply chains can still be inconsistent.	“Volatile styrene supply and pricing risk for EPS cores” exists as an ICF industry tailwind (Mordor, 2026).
CF10: Buyer Demand / Marketability	Alabama DOI, Redfin (2026a,b), Zillow (2024a,b)	Lack of awareness of benefits, climate risk awareness	Growing awareness of climate risks and benefit incentives for ICF homes	“climate events are a common concern with 73% of U.S. homebuyers considering at least one type of climate risk (ex. Flood, Wildfires) in 2024” (Zillow, 2024a)

Secondary data coding and thematic analysis revealed 10 key competitive factors in Table 1 which insulated concrete form compete upon in the construction market in order to appeal to both consumers and builders.

Overall, ICF construction carries a persistent upfront cost premium (CF1) and faces some supply chain volatility (CF9), particularly as a niche market solution without economies of scale. However, many competitive factors are inherent technical advantages of working with concrete material, and ICF specifically as a comprehensive concrete pour and insulation wall system. Long-term advantages include durability and weather resilience (CF3), energy efficiency and operating costs (CF4), maintenance requirements over long-term periods (CF6), increased design flexibility (CF7), and decreased homeowners’ insurance risk (CF5). Additional strengths include faster construction speed with fewer steps (CF2), and regulatory/code compliance that often surpasses minimum standards (CF8). Marketability is improving as buyer awareness grows regarding ICF as a product and of climate risks (CF10). These factors collectively position ICF as a resilient, cost-effective solution over the building lifecycle despite initial barriers.

4.2. Assessing Industry Adoption with Primary Data

4.2.1. Interview Participant Metadata

Participant metadata was detailed in Appendix D, Table D1, but avoids the use of personal and company names to remain confidential and anonymous. Data saturation was reached with seven interviews throughout the ICF value chain with rich, detailed responses over approximately 65 pages of transcript.

Participants were targeted based on a geographic proximity strategy to address the ICF value chain in the U.S. Census Bureau’s *South* defined region (Appendix B), however participant

referrals and connections came from other North American markets, notably Southern Ontario, Canada. Interview data remained relevant as the Canadian residential market maintains close similarities to the U.S. residential market including wood-frame dominance, climate risks, and ICF used as a niche construction solution (Journey et al., 2022).

4.2.2. Coded Matrix for DOI Attributes and Competitive Factors

4.2.2.1. DOI Adoption Barriers Matrix (Tied to Appendix C, interview Section 2, Q4-Q8)

A deductive thematic coding analysis of the seven stakeholder interviews mapped directly to Rogers' (2003) five attributes of innovation adoption is summarized in Appendix D, Table D2. It identifies key perceptual and structural barriers to ICF adoption in the residential market, from the perspective of builders, contractors, and related professionals.

- **Relative Advantage:** Stakeholders consistently and clearly highlighted strong objective long-term benefits of ICF (energy savings, sound attenuation, disaster resilience, durability, and reduced maintenance), especially in hotter and higher risk climate zones. However, these advantages are frequently undermined by persistent focus on upfront cost premiums, hesitancy of a different building system and widespread misconceptions among buyers and builders.
- **Compatibility:** Overall there is low compatibility with existing wood-frame business processes. ICF requires builders to change planning, supply chains, scheduling, and adapting workforce skills, requiring a coordinated effort by the builder to change or educate many of their stakeholders. Traditional general contractors and subcontractors show resistance to altering established practices.
- **Complexity:** The technical learning curve is relative short and trainable. Most stakeholders reported that workers can be trained quickly, with an experienced and knowledgeable teacher. Perceived complexity comes from unfamiliarity and business-level uncertainty, rather than inherent or technical difficulty.
- **Trialability:** It is difficult for builders or developers to trial at full-home scale without the incentive of strong homeowner demand or code mandates. Small-scale pilots such as safe rooms, basements, and pools, are more feasible entry points.
- **Observability:** There is very low visibility of ICF as a product and its key benefits. Most homeowners and many builders have never experienced or seen an ICF home. Experiential marketing and local prevalence, such as walk-throughs and demonstration homes, were cited as essential for consumer ICF diffusion. Industry

stakeholders advocating for the product stated that consumer demand must be high enough to incentivize industry diffusion.

Strong objective advantages of ICF exist, but perceptual, compatibility, and observability barriers prevent voluntary market adoption in the absence of education, incentives, or regulatory push.

4.2.2.2. Competitive Factors Matrix (Deductive – tied to interview Section 3, Q9-20)

Interview data recorded in Appendix D Table D3 was mapped onto the ten industry competitive factors (plus two emergent factors) identified in secondary research, showing strong consensus on ICF's performance strengths and weaknesses.

The upfront construction cost premium (CF1) remained the dominant perceived disadvantage, especially for price-sensitive middle-market buyers and builders focused on short-term margins. However, when viewed through total cost of ownership (paying for the mortgage, insurance and utilities), several participants noted that ICF homes could deliver lower ongoing monthly payments and reap the benefits of energy efficiency long after paying off the house. Construction speed (CF2) was described as initially slower due to the learning curve but ultimately faster once teams gained experience, as ICF combines framing, insulation, and structural elements in fewer steps.

ICF's strongest differentiators were durability and weather resilience (CF3), energy efficiency and operating costs (CF4), long-term maintenance reduction (CF6), and sound attenuation (CF11); benefits repeatedly praised as transformative in high-risk markets. Insurance premiums and insurability (CF5) was also seen as increasingly important given rising climate-related costs, but residential benefits varied at the discretion of insurance companies, remaining an uncertain advantage for cost savings. Design flexibility (CF7) and regulatory/code compliance (CF8) were rated favorably, with concrete's structural strength enabling open layouts and larger openings not easily achievable with wood-frame. Supply-chain reliability (CF9) and buyer demand/marketability (CF10) were identified as moderate weaknesses, primarily due to the need for advanced planning and extremely low consumer awareness. Location (CF12) remained a top consumer priority, unaffected by construction method.

Collectively, the coding in Table D3 demonstrates that ICF outperforms wood-frame construction on nearly all long-term value and resilience factors, yet is hindered by upfront cost perception, construction ecosystem inertia, and limited visibility. All findings that directly support the identification of mid-market gaps in RQ2.

4.2.3. Thematic Analysis and Overarching Themes

Thematic analysis of the combined DOI and competitive-factor coding, presented in Table 3 below, revealed five overarching themes that capture the core barriers and opportunities of ICF adoption.

The first theme, *cost versus long-term value trade-off*, highlighted the persistent cycle incentivizing wood-frame builders based on builders' focus on upfront margins and homeowners' upfront price sensitivity. Interviewees stressed that consumer education on lifetime ROI was the single most important lever for shifting perceptions and growing consumer demand to incentivize industry change.

The second theme, *industry resilience to change and perception barriers*, reflected deep entrenchment within the wood-frame construction ecosystem. Compatibility issues, "muscle memory" efficiency of trades, and the lack of immediate incentives or consumer demand for general contractors created strong resistance, even though participants described the actual technical changes as manageable. The third theme identified the *high-end/custom home concentration of the ICF residential market*, noting that current single-family ICF projects are overwhelmingly large luxury homes, typically 4,000+ square feet, whereas the average new U.S. single-family home in 2024 was approximately 2,400 square feet (U.S. Census Bureau, 2025d). This leaves a clear gap in the more price-sensitive high-middle market.

The fourth theme, *consumer and stakeholder education/ product awareness*, was the most frequently cited barrier and opportunity. Extremely low visibility of ICF as a product and its benefits meant that experiential marketing, through demonstration homes, site visits, and interactive tools, were viewed as essential for diffusion. Finally, the fifth theme, *codes, incentives & high-risk geography as adoption drivers*, pointed to regulatory tailwinds (such as energy codes, Fortified programs, and resilience grants) and the insurance crisis as the strongest current catalysts for widespread ICF adoption.

These five themes synthesize the primary data and provide the empirical foundation for the Blue Ocean Strategy reconstruction presented in Section 4.3.

Table 3

Thematic Analysis of Coded-Review Matrices from Interview Data

Source: Interview Data, Appendix D Tables C2 and C3

Theme	Linked DOI/ CFs	Description/ Interpretation	Mentioned by Participants	Illustrative Quotes
Cost vs. long-term	Relative Advantage,	While builders focus on upfront margin	P1, P2, P3, P5, P6, P7	"the monthly cost of house payment, insurance and

value trade-off	CF1, CF4, CF5, CF6	and processes, homeowners continue to focus on upfront cost. Homeowners would benefit most from value lifetime ROI of ICF savings, however short-term mindset and lack of product awareness hinders adoption.		utilities, your monthly payment on an ICF is going to be lower than the payment for an equivalent wood-built home... You've got more upfront money, but you're making it back immediately" (P1), "[do] not just look at the first cost, but look at the total cost of living to be in that home" (P7).
Industry resilience to change and perception barriers	Compatibility, Complexity, Observability, CF9, CF10	GCs and subcontractors show resistance to ICF due to process changes, time and training required. Lack of significant incentive (consumer demand or codes) leaves change undesirable. Hurdles reportedly not difficult to overcome, but requires adaption by multiple stakeholders (subcontractors, GCs, architects).	P1, P2, P3, P6, P7	"it's not hard, it's just different" (P7), "They (general contractors) will get pushback in from those subs (subcontractors) that also don't want to do something new" (P7), "there's going to be an architect involved. And they don't want to mess with it" (P1), from the builder perspective "I don't get paid extra for this. There's plenty of wood. There's plenty of people that know how to do wood. I'm going to stick with that... He's got an easy route to go already. He's making plenty of money. The building codes don't require it. They don't give any kind of benefit to having it" (P2).
ICF residential market primarily high-end/custom	Trialability, CF1, CF7, CF10	Residential single-family home ICF adoption is limited to expensive custom homes. A mid-market gap persists due to price sensitivity on initial cost, lack of consumer education/awareness, and economies of scale for wood-frame housing.	P1, P2, P4, P7	"There's one of the easiest things to do within ICF is to get a large custom luxury home and to get it to go ICF... Whenever you hit that mid-market, then it gets tougher because we're more tied to a budget" (P7), "the average [ICF] house is running probably...four to 5,000 square feet or more" (P3), "And most times these houses are four or five thousand square feet. So they're pretty big houses" (P2).
Consumer & stakeholder education /	Relative Advantage, Complexity	Extremely low awareness of ICF continues to be an issue in generating	P1, P2, P5, P6, P7	"I think the biggest concerns to the industry are perception... if I mention in a group of people ICFs,

product awareness	Observability, CF10	consumer demand. ICF benefits are clear and the upfront cost premium is easily overcome with product education, however internal ICF industry competition prevents a cohesive campaign against wood-frame housing dominance. In the re-sale market, customers purchase from existing inventory, which is primarily wood frame (P5), although experiencing ICF is one of the most effective marketing methods.		nobody knows what I'm talking about, which is just crazy for as long as it's been around" (P1), "And so when people would walk in and they'd see [the temperature difference], they'd say, wow, this is really something. So all the energy efficiency we'd been talking about all of a sudden becomes very real to them" (P2), "when you're building one, and one's going up in a neighbourhood and you've got your sign, that's where the interest comes. So people stop by every day... And they're asking questions or can I walk on your site? Can I look at the project? So we find that that generates a lot of momentum or interest" (P3).
Codes, incentives & high-risk geography as adoption drivers	Relative Advantage, Trialability, CF3, CF5, CF8	Regulatory pushes for improved home energy efficiency prove the most promising for widespread ICF adoption. However, regulation varies drastically by state, with many not sufficiently incentivizing ICF through energy codes, climate resilience codes, or guaranteed insurance discounts. The voluntary market lags while ICF exceeds codes.	P1, P2, P3, P6, P7	"Now, there are areas where, like Florida, where the codes pushed it, because they have to be able to withstand those wind-driven debris and the high winds themselves and the rain. Texas actually has the same thing down very close to the coast, but the area is limited" (P1), "the building codes are focused more on being green and saving energy" (P2)

4.3. Gaps and Blue Ocean Opportunities

The combined primary and secondary data revealed three overarching barriers to ICF's voluntary adoption across wood-frame dominant North America, particularly in high climate-risk areas similar to Alabama's Mobile and Baldwin Counties (RQ1).

The first barrier is a consistent upfront cost premium focus rather than a long-term value mindset, favouring short-term thinking among builders and buyers. With a heavily

established wood-frame industry and economies of scale, the upfront cost premium of ICF will remain until large-scale adoption is reached. Consumers must be educated on why long-term ICF benefits outweigh the initial house price and how ICF benefits can actually lower monthly payments over their long-term mortgage.

Secondly, industry resistance to ICF adoption is a result of the ingrained wood-frame housing ecosystem, compatibility difficulties with existing practices, and low observability of benefits by builders and buyers. Current wood-frame housing material supply chains are plentiful and easily interchangeable (e.g. wood planks readily available and standardized) whereas ICF distribution is company specific. Labour experienced with ICF is regionally dependant but typically low and subcontractor unfamiliarity with ICF results in lost efficiency. Although these barriers can be easily overcome with material planning and ICF training, there is not sufficient incentive for builders to change, as they do not reap the benefits of ICF homeownership and consumers, mostly unaware of ICF as a product, have not generated mid-market demand.

Thirdly, ICF construction remains concentrated in the high-end custom home market, as a niche premium product. Although the price-sensitivity of the mid-market make it difficult as an entry point, there is high-middle market gap for standard designed premium ICF homes. Interviewees consistently identified education through explanation and experiential learning as the single largest lever for overcoming observability and compatibility barriers (P1, P2, P3, P7). At the same time, demographic trends (aging repeat buyers, equity-rich Baby Boomers) and state level incentives (Alabama DOI fortified homes program) create an opportunity for a differentiated high-middle market offering. These findings directly inform the Blue Ocean tools below and support the proposed business model.

4.3.1. Strategy Canvas

Based on the competitive factor matrix (4.1.2.2) and interview coding (4.2.2., 4.2.3.), the strategy canvas below contrasts the strategic profiles of custom ICF homes (current niche) and mid-market wood-frame homes (red-ocean dominant) in the U.S. residential market, according to Blue Ocean Theory (Kim & Mauborgne, 2005, 2017).

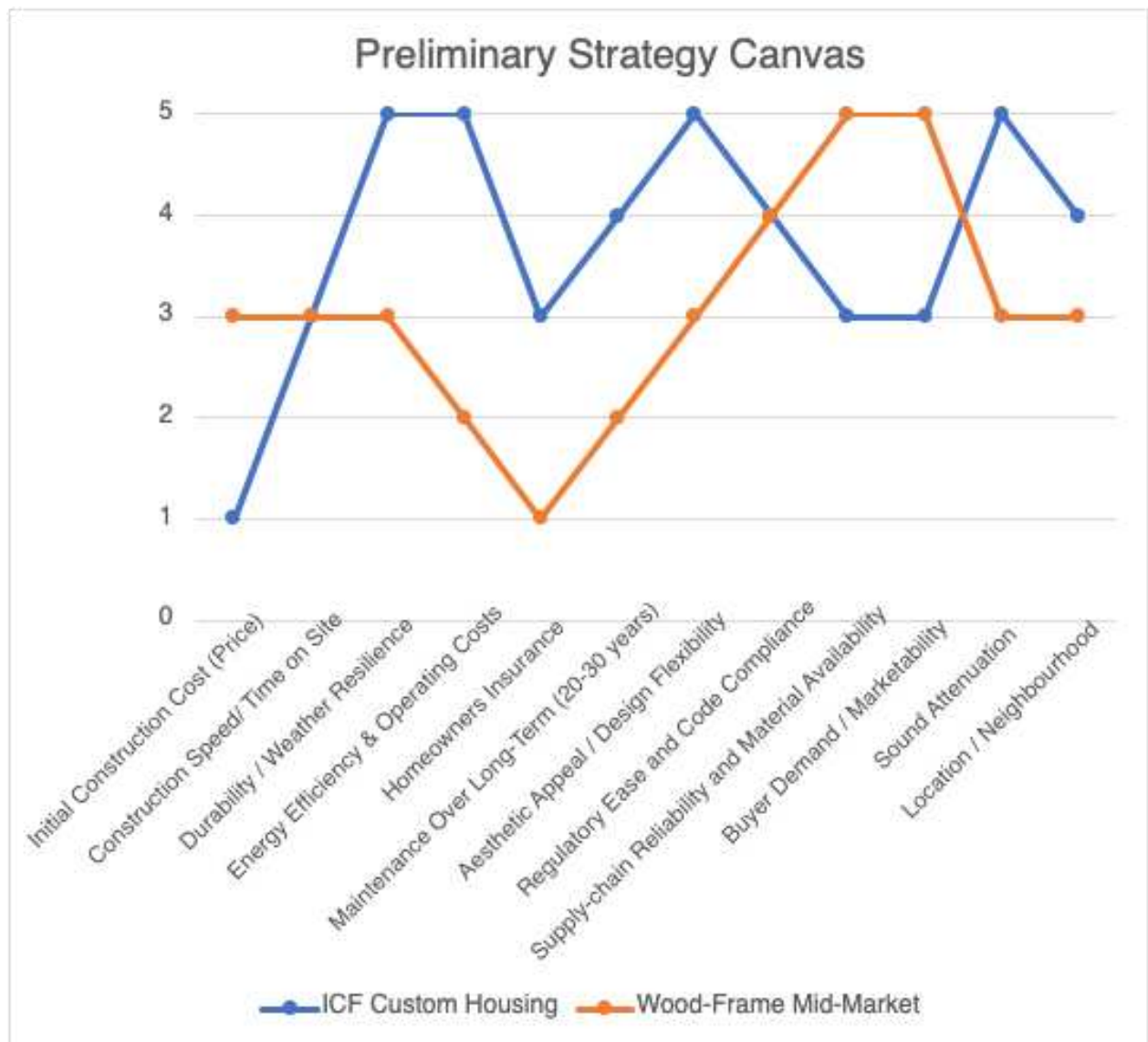
The canvas uses the 12 key competitive factors identified in the research. The vertical axis represents the offering level buyers receive, with five considered the best performance and zero the worst performance. Both curves show convergence on regulatory ease and code compliance, with ICF now prescribed in the building codes. Whereas both options diverge on many of ICF's inherent strengths (durability, energy efficiency, insurance savings, long-term

maintenance, sound attenuation), as well as high-end custom home benefits, like custom design flexibility, and selection of lot location (but the lot must be big enough for the home). However, these strengths remain in the luxury segment and are poorly communicated to mid-market buyers.

Figure 1

Preliminary Strategy Canvas

Source: Table 1, Appendix D Tables D2 and D3



4.3.2. The Four Actions Framework

The four actions framework uses “four key questions to challenge an industry's strategic logic and business model” (Kim & Mauborgne, 2005). Guided by secondary data competitive factor analysis (4.1.2.2.) and primary data interview findings (4.2.2. – 4.2.3.) the framework

is used to reconstruct the boundaries of the ICF custom home market and middle-market single-family residential construction industry in high-risk Alabama areas.

Four Actions Framework:

1. Eliminate: Which of the factors that the industry takes for granted should be eliminated?
 - a. Full architectural processes of custom ICF homes should be eliminated to reduce costs and developer driven speculative construction will be eliminated to allow focus on individual committed customers' homes. These elements are removed because they drive the high-end concentration of ICF and limit accessibility for high-middle market retirees who prioritize speed and location choice over unlimited customization and high cost.
2. Reduce: Which factors should be reduced well below the industry's standard?
 - a. The consumer focus on the upfront cost premium, learning curve delays for contractors, and price-only advertising. These are reduced to address and lower price sensitivity for the equity-rich retiree segment while preserving ICF's advantages.
3. Raise: Which factors should be raised well above the industry's standard?
 - a. Buyer education and observability must be raised, particularly experiential education, presentation of ICFs long-term benefits, and total cost of ownership messaging. Design flexibility for the middle market should be raised, as niche ICF construction will still be individually sold and constructed for educated buyers. Finally, construction speed and timeline certainty will need to be clear for consumers to trust the business and move-in wait time. These are raised well above industry standards to bring the 'premium' ICF custom feel into the high-middle market and convert wary customers.
4. Create: Which factors should be created that the industry has never offered?
 - a. A 'custom' home design from a few standardized models that simplifies choosing a home (from unlimited customization or unlimited existing resale options) while acting as an education engine to explain the monthly cost of owning an ICF versus a traditional home. Another offering would be location choice with individual lot selection from a pre-approved portfolio of open lots. Finally, a seamless transition package to help consumers with bridge financing, temporary housing coordination, and give a guaranteed move-in

timeline. These new elements create demand by resolving consumer pain points of the middle market while raising observability and education of ICF, and facilitating the real-world transition of downsizing retirees in high-risk zones.

4.3.3. Eliminate-Reduce-Raise-Create Grid

The ERRC grid states what changes a company would make to act upon the four actions framework to create a new value curve. It eliminates and reduces factors that drive red-ocean convergence and cost, while raising and creating factors that address the barrier and opportunities found in the research.

Table 3

Eliminate-Reduce-Raise-Create (ERRC) Grid

Source: Blue Ocean Strategy (Kim & Mauborgne, 2005) and 4.3.2. *The Four Actions Framework*

Eliminate	Raise
-Full architectural processes (typical of custom ICF) -Speculative construction (building to sell to an unknown customer)	-Construction speed and timeline certainty -Buyer education/observability -Total cost of ownership messaging -Design flexibility for the mid-market
Reduce	Create
-Perceived upfront cost premium (through smaller houses and ROI education) -Learning curve delays (with standardized design) -Price-focused advertising	-Standardized ‘custom’ design -Location selection -Transition package and customer support

4.3.4. Business Model – Resilient Bungalows

Based on the four-actions framework and eliminate-reduce-raise-create grid, the proposed business solution is the *Resistant Bungalows* business model, which would be a premium high-middle market ICF developer offering smaller (1200, 1500 and 1800 square feet) single-level bungalow-style homes, customized by the consumer with an interactive website, similar to the design of a new car purchase (Tesla Inc, n.d.), allowing the configuration of three standard house models with three tiers of interior finish and three types of exterior finish. The website also serves to inform consumers on estimated long-term cost savings, product education, and regional incentives, like Alabama Strong Homes (2025). The model targets equity-rich repeat homebuyers and downsizing retirees (with the repeat buyer median age at 62 and Baby Boomers the largest buyer segment at 42% (National Association of Realtors, 2024), using build-to-order processes on pre-vetted affordable/foreclosed lots (or buyer

supplied lots) for location choice, incorporates a seamless transition package with excellent customer service (bridge-financing help, temporary housing coordination, and a 6-9 month move-in guarantee), and uses 1-2 initial Airbnb-operated demo units for consumer education. This directly addresses the upper-middle market gap (U.S. Census Bureau, 2025b) between large ICF custom homes and middle-market wood-frame residential while developing the business around removing observability/education barriers and ICF upfront cost hesitancy.

4.3.5. New Business Strategy Canvas

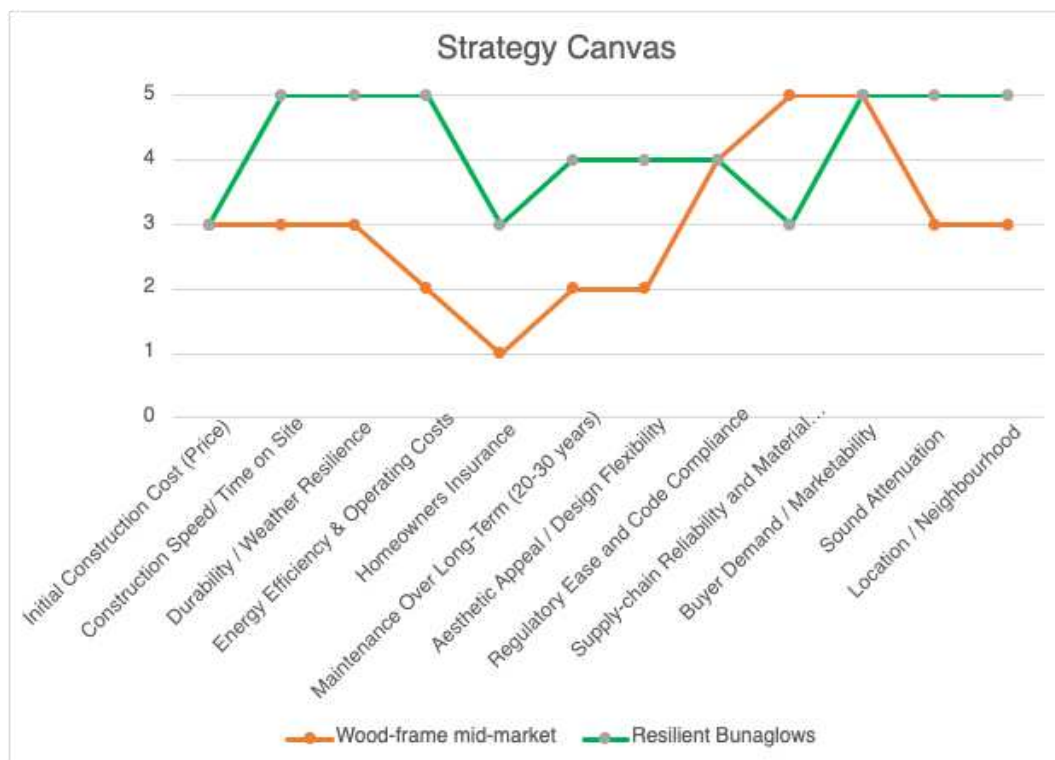
The new business strategy canvas below (Figure 2) shows the divergent value curve created by the ERRC grid and *Resilient Bungalows* model, focused on competing with middle-market wood-frame resellers.

Many competitive factors of ICF are inherent in the material, therefore these top performing aspects remain unchanged but will be better marketed such as durability, energy efficiency, long-term maintenance, and sound attenuation. Additionally, eliminating full architectural processes through design standardization and overall building size allowed for increased performance of the initial construction cost, better competing with wood-frame houses while offering a premium product and experience.

Figure 2

Strategy Canvas

Source: Blue Ocean Strategy (Kim & Mauborgne, 2005), Figure 1, Table 3



Tagline: Smaller, smarter, stronger. Your bungalow and investment, configured for retirement peace of mind.

The new value curve meets the three characteristics of a good blue-ocean strategy: focus, divergence, and a compelling tagline (Kim & Mauborgne, 2005). Focus is met with an emphasis on retiree-specific home design in limited options, marketing on long-term value and education. Divergence is seen with a clear break from both wood-frame and high-end custom ICF. Finally, the compelling tagline and value proposition speaks directly to target buyers.

This completes the research findings. The Blue Ocean tools have translated the identified gaps and barriers into an actionable business model ready for implementation.

5. Discussion

The analysis and findings presented in chapter 4 reveal a high-middle market opportunity for Insulated Concrete Form (ICF) adoption in Alabama's high-risk coastal counties while highlighting current structural and perceptual barriers. This discussion interprets those findings through the lens of Blue Ocean Strategy (Kim & Mauborgne, 2005), evaluate the proposed Resilient Bungalows business model against the research questions, and compares the model with current industry dynamics. The discussion demonstrates how the model transforms the identified gaps into a differentiated Blue Ocean strategy for a new high-middle market ICF developer.

5.1. Interpretation of Findings in Relation to Blue Ocean Strategy

The strategy canvas (4.3.1.) confirms the red-ocean positioning of the existing market identified in both secondary data and stakeholder interviews. Wood-frame middle-market builders compete primarily on upfront price, economies of scale, and broad marketability, leveraging industry dominance and the existing wood-frame ecosystem. On the other hand, ICF offerings remain trapped in the high-end custom segment (4,000+ square feet), with limited product observability, accessibility and options. The value curves of both segments remain very divided, leaving the high-middle-market underserved on attributes this segment would value: lower long-term cost of ownership, resilience, energy efficiency, insurance savings, and less long-term maintenance.

The Four Actions Framework (4.3.2.) and ERRC Grid (4.3.3.) reconstruct some of these factors and the business model to break the value/upfront cost trade-off. The Resilient Bungalows model reduces the upfront cost premium by eliminating full architectural design and using smaller home sizes, while reducing the perception of upfront cost premium with an education engine on ownership ROI, mid-market home customization, and location selection. These factors, combined with seamless transition support and timeline certainty, creates a divergent value curve (4.3.5.) focused on retiree specific peace of mind in their personal largest investment, while offering clear differentiation from both wood-frame volume builders and luxury ICF.

5.2. Addressing RQ2: Gaps in the Current ICF Development Market and Innovative Strategies for a New Entrant to Claim Market Share

RQ2 asked: *What gaps exist in the current ICF development market and what innovative strategies could a new entrant use to claim market share?*

The findings identified three primary gaps in the current ICF development market. Firstly, ICF construction remains concentrated in high-end/custom segments with scarce mid-market offerings. Second, there remains extremely low visibility and education of ICF as a product, never mind its benefits, among consumers. Builders and the labour force also remain inexperienced and disinclined to adapt, perpetuating higher construction prices. Lastly, there is not sufficient cost vs. long-term value marketing for the mid-market, but instead competition of the existing high-end residential or commercial market.

The Resilient Bungalows model directly closes these gaps through Blue Ocean reconstruction:

- The mid-market accessibility gap is addressed by smaller (1200-1800 square foot) single-level bungalow designs that lower total purchase price while preserving ICF's inherent advantages, making the product affordable for downsizing retirees who hold significant home equity.
- The education and observability gap is closed by the interactive website configurator, presenting three standardized models with three finish tiers, real-time ROI and monthly payments with estimated energy and insurance savings, and move-in timeline dashboards. This experiential education engine turns the single largest barrier into a core differentiator and sales promotion tool, giving quantitative metrics to ICF benefits.
- Market-share capture strategy uses build-to-order on pre-approved affordable, foreclosed, or buyer-supplied lots, rather than heavy speculative development, typical of large-scale wood-frame builds. This minimizes capital risk for a new entrant while giving consumers location choice. The seamless transition package removes the practical friction of selling an existing home to fund a build-to-order ICF home, reducing pain points and optimizing customization, giving the high-middle market a premium experience.

Together, these innovations create new demand from climate/insurance-wary retirees (73% of buyers consider climate risk, Zillow 2024a) looking to protect their accrued equity for the foreseeable future, without directly competing on the red-ocean factors of lowest upfront price and existing market inventory.

5.3 Addressing RQ3: Effective Market Entry and Substantial Differentiation for Long-Term Growth

RQ3 asked: *How can an ICF developer effectively enter the market while establishing substantial differentiation for long-term growth?*

The Resilient Bungalows model provides a practical, low-risk entry path aligned with NAHB data on small-developer realities (median 6 homes/year), with a staged entry planned for Mobile and Baldwin Counties, in Alabama.

- Year 1: Three homes built using the website configurator, ideally one of each floorplan model. Two created for consumer sale, and one demo/rental unit to prove concept and generate experiential-driven referrals.
- Year 2-3: Scale to 6-10 homes per year with repeatable standardized processes, pre-approved permitting templates, and subcontractor training to overcome the learning curve for efficiency.
- Long-term growth: The model is highly replicable across all other states, but holds the most consumer benefit and marketability in climate disaster-prone areas with rising insurance premiums, such as the U.S. South region (U.S. census bureau, n.d.).
Recurring revenue from optional maintenance guarantee plans or increased rental units creates stable cash flow. Differentiation is sustained through the education website and custom housing configurator, local segmentation of construction (Joint Center for Housing Studies, 2022), and the retiree-focused value proposition that aligns with consumer trends, state incentives (Alabama DOI, 2025) and insurer preferences.

This combination of build-to-order standardization, digital customization, and experiential education established defensible differentiation while mitigating compatibility and observability barriers that have confined ICF to a niche construction solution.

5.4. Alignment with Industry Outlook and Practical Feasibility

Mordor Intelligence (2026) identifies green-building codes, resilience grants, and energy-efficiency demand as key drivers, offset by upfront cost and skilled-labour gaps as the biggest headwinds. The Resilient Bungalows model amplifies the drivers through education and inherent ICF advantages, while directly mitigating the restraints with smaller scale requiring lower capital needs, standardization and training reducing labour friction, and education creating demand from consumers rather than a push from builders.

Financial feasibility is supported by the SOM calculations (4.1.1.3.). By prioritizing Baldwin County's higher-weighted average home prices and focusing on equity-rich buyers, the model improves absorption rates and per-unit margins. The inclusion of 1-2 initial demo/rental units

provides early revenue, proof-of-concept for lenders and insurers, and a low-risk platform for experiential marketing. Overall, the model aligns closely with current industry realities while remaining executable for a new-entrant developer operating at the NAHB small-business median scale.

5.5. Macro Trends

Several broader macro trends could greatly strengthen the Resilient Bungalows value proposition, although their timing and intensity remain uncertain and require ongoing assessment.

Continued tightening of energy codes and the expansion of performance-linked incentives at state and federal levels are expected to favour high performance construction systems such as ICF. Alabama's Fortified Homes program and potential federal resilience grants already provide tangible financial and regulatory support (Alabama DOI, 2025). The inherent benefits of ICF construction position it to capitalize immediately on these shifts.

Secondly, the homeowner insurance crisis provides a potential powerful tailwind. With premiums rising 24% between 2021 and 2024 and increasing uninsurability in high-risk zones (Cornelissen et al., 2025; Moore, 2026), insurers are actively seeking lower risk products. Strategic partnerships with insurance carriers, offering group policies or meaningful premium discounts for Fortified ICF homes, could become a central marketing and revenue level for the business.

While material cost volatility driven by market shocks and supply chain disruptions continue to erode the traditional cost advantage and predictability of wood-frame construction (Lamichhane et al., 2025; Guo et al., 2025), interest rate movements and broader real estate market cycles present greater effects and uncertainty. In a higher interest rate or high energy inflation environment, the Resilient Bungalows model competes well by targeting equity-rich buyers and consistently lowering operating costs. However a sharp decline in interest rates could accelerate housing supply and intensify mid-market competition.

These macro trends can reinforce or hinder the blue-ocean opportunity by amplifying demand for ICF or wood-frame mid-market homes. Sufficient sensitivities should be taken into account when calculating financial projections of the business model.

5.6. Limitations and Future Research Directions

Although the mixed-methods design and stakeholder interviews achieved data saturation for a coherent blue ocean strategy, several study limitations must be acknowledged. The study is

geographically scoped to Alabama's Mobile and Baldwin Counties; while representative of similar high climate-risk markets, findings may not generalize perfectly to other U.S. high climate-risk markets due to the most common natural disaster by geography (ex. earthquakes), differing state regulation, labour, or buying dynamics.

The primary data collected information from seven industry stakeholders provided rich supply-side insights, but they do not include direct consumer testing of the Resilient Bungalows model. In particular, the end-user acceptance of the interactive website configurator, the appeal of smaller size bungalow designs, and the practical effectiveness of the seamless transition package remain untested.

Finally, the SOM projections and financial feasibility assumptions, while grounded in NAHB benchmarks and industry data, require more granular cash-flow modelling to confirm working-capital requirements, break-even timing, and resilience to fluctuations in material costs, interest rates, or construction delays for a new-entrant developer.

Future research should therefore focus on empirical validation of the model, financially and with consumers. Priority areas include:

- Proof-of-concept testing with the target consumer segment (equity-rich repeat buyers and downsizing retirees aged 60+), including prototype evaluation of the configurator, experiential tours of demo/rental units, and quantitative assessment of willingness-to-pay.
- Detailed financial modelling, encompassing full financial statements, sensitivity analysis, and multi-year cash flow forecasting to ensure operational sustainability during the initial ramp-up period.
- Pilot implementation studies that track actual adoption rates, consumer satisfaction, insurance outcomes, and long-term performance.

6. Conclusion

The thesis set out to investigate whether a viable market opportunity exists for a mid-market ICF single-family home developer in high-risk climate zones of the United States, and to propose concrete entry strategies for increasing voluntary ICF adoption. Focused on Alabama's Mobile and Baldwin Counties as an entry point, the study combined secondary market data, TAM-SAM-SOM analysis, and seven in-depth stakeholder interviews to characterize the ICF construction and real-estate market (RQ1), identify gaps in the current ICF residential development landscape (RQ2) and develop an innovative differentiation strategy for long-term growth (RQ3).

The findings confirm a clear market opportunity. Traditional wood-frame construction continues to dominate the U.S. single-family home market at 94% of new homes nationally (2024), yet ICF offers objectively superior durability, energy efficiency, insurance savings, maintenance reduction, and sound attenuation; advantages that are especially valuable in hurricane and tornado prone areas of the U.S. However, voluntary adoption remains extremely low due to three interlocking barriers: a persistent focus on upfront cost rather than lifetime value for the consumer keeping ICF concentrated in the less price sensitive high-end custom segment, low observability and education of ICF overall as an available product and its major benefits, and industry resistance to adoption due to compatibility issues with current practices and low incentive to change. All these factors leave the mid-market completely underserved.

The Blue Ocean Strategy tools applied in Chapter 4 directly translate these findings into an actionable business proposal. The strategy canvas revealed divergences between wood-frame mid-market offerings and luxury ICF. The Four Actions Framework and ERRC Grid then systematically reconstructed the value curve, eliminating luxury architectural processes and speculative development, reducing perceived upfront premiums and complexity, and raising/creating mid-market customization, experiential education, timeline certainty, and a seamless transition package, targeting downsizing retirees. The resulting Resilient Bungalows model produces a unique value curve with smaller single-level bungalow-style ICF homes customized by an interactive website interface, built to order on pre-approved affordable lots, and launched with 1-2 demonstration/rental units. This model follows the clear tagline: "Smaller, smarter, stronger. Your bungalow and investment, configured for retirement peace of mind."

This model directly answers all three research questions. It characterizes the U.S. and ICF market and its barriers (RQ1), fills the mid-market and education gaps with targeted innovative strategies (RQ2), and provides a practical entry path with sustainable differentiation through standardized custom design, experiential education, and lifetime value emphasis (RQ3). The approach aligns with NAHB small-developer realities, leverages Alabama's IBHS Fortified program and resilience grants, and converts the looming home insurability crisis into a profitable growth opportunity.

The Resilient Bungalows model contributes both theoretically and practically to current academic research. It demonstrates how Blue Ocean Strategy can be applied to a mature, capital-intensive industry such as residential construction to grow adoption of an environmentally and technologically superior building material. For practitioners, it offers a replicable template and business model ideas for promoting ICF in the U.S. middle-market. For policymakers and insurers, it illustrates how targeted education, smaller resilient homes, and consumer-focused incentives can accelerate climate adaptation while reducing long-term claims.

Limitations include the regional focus on Alabama and similar U.S. South areas, the absence of consumer prototype testing for the business model, and full financial modelling for projected earnings and break-even timing. Future research could validate the model through a pilot project, extend the analysis to additional U.S. or Canadian geographies, or quantitatively test buyer willingness-to-pay for the premium high-middle market product.

In conclusion, the evidence presented demonstrates that a meaningful market opportunity exists for mid-market ICF adoption in climate-vulnerable regions, particularly the U.S. South and Alabama. By addressing the education barrier, lowering the effective cost of entry for equity-rich retirees, and creating a compelling new value proposition, the Resilient Bungalows model provides a practical pathway to move ICF from a niche solution to mainstream voluntary demand. Implementing this strategy can simultaneously improve homeowner disaster resilience, reduce insurance-system strain, and deliver profitable growth for a new ICF developer, turning the challenges of climate change into a genuine blue-ocean opportunity.

Appendices

Appendix A

Figure A1

“(a) Typical ICF block. (b) ICF block with concrete poured.”

Source: Ghosh & Bigelow, 2025.



Note. From “Comparative Analysis of Energy Efficiency: Insulated Concrete Form vs. Wood-Framed Residential Construction,” by S. Ghosh and B. Bigelow, 2025, *Buildings*, 15(5), Article 804. Licensed under Creative Commons Attribution 4.0 International License.

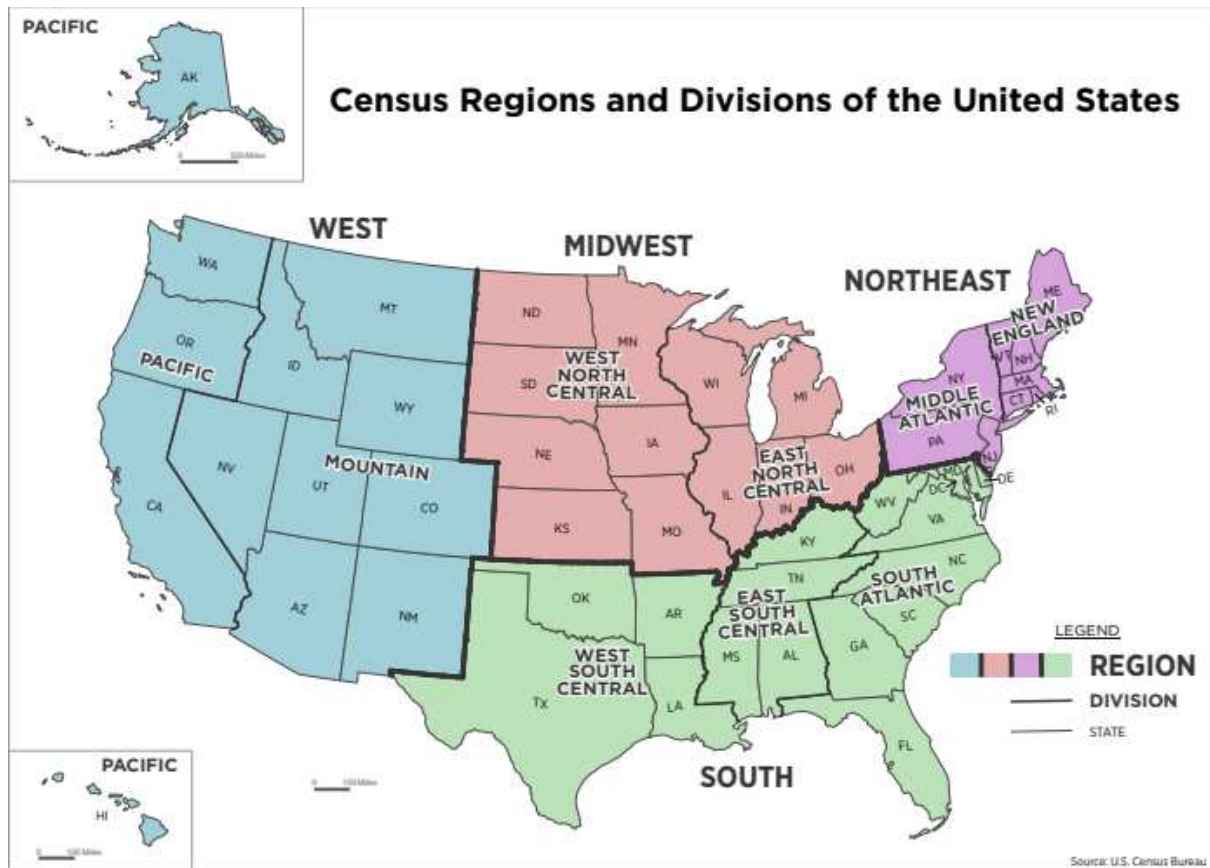
Appendix B

Figure B1

U.S. Census Bureau 'Census Regions and Divisions of the United States'

Source: U.S. Census Bureau. (n.d.). Census regions and divisions of the United States [Map].

https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf



Appendix C

Interview Questions:

Introduction Script:

“Hi _____, nice to meet with you. As you know my name is Josh, I’m a business masters student studying Insulated Concrete Form adoption, particularly in high climate-risk areas of the United States. This interview is part of my dissertation’s primary research to analyze industry perspectives on residential ICF, and find out what may be preventing or pushing it’s use. Before we get started, I just want to confirm, do I have your permission to record this interview for transcription and later analysis? Your responses remain fully confidential and anonymized; and you may withdraw at any time.”

Section 1: Background and Experience (5-7 mins)

1. Can you briefly describe your role and how long you have been working in residential construction / real estate? In which geographies? How long (years)?
2. What types of single-family homes do you typically work with (e.g., wood-frame, concrete, custom, mid-market, etc.)?
3. Have you had any direct experience with ICF construction? If yes, can you describe a recent project? If no, what is your general awareness of ICF?

Section 2: Diffusion of Innovation (Adoption Barriers) (15–20 min)

Framed from the stakeholder’s perspective (Rogers, 2003, Ch. 1 & 5).

4. **Relative Advantage:** In your view, what are the main advantages (or disadvantages) of ICF compared to traditional wood-frame construction for builders and buyers? Particularly in high climate-risk areas?
5. **Compatibility:** How compatible is ICF with your current business practices, supply chains, workforce skills, and client expectations? What would need to change for it to fit more easily?
6. **Complexity:** How complex or difficult do you (or your peers) perceive ICF construction to be relative to wood-frame? What specific challenges come to mind? (e.g. training, permitting, sequencing)
7. **Trialability:** How easy is it for builders or developers in this market to “try” ICF on a small scale? (e.g. one or two homes, safe room, etc..) before committing fully? What would make trialling ICF easier or more appealing?

8. **Observability:** How visible or observable are the benefits of ICF homes to other builders, buyers, or insurers? Have you seen successful examples that influenced decisions?

Section 3: Industry Competitive Factors (10 mins)

Using the 10 factors below (derived from Table 1: *Industry Competitive Factors Derived from Secondary Data*), ask participants to comment on market importance of the factor and then comment on ICF performance.

Instructions to participant: “I’m going to read a list of factors that home buyers and builders in this market may compete on or care about. For each one, please (a) comment on how important it is in today’s residential market, and (b) tell me how ICF performs compared to traditional wood-frame on that factor.”

Competitive Factors (ask one by one):

9. Initial construction cost (estimated premium?)
10. Construction speed / time on site
11. Durability / storm & weather resilience
12. Long-term energy efficiency & operating costs
13. Homeowners insurance premiums & insurability
14. Maintenance requirements over long-term periods (e.g. 20-30 years)
15. Aesthetic appeal / design flexibility
16. Regulatory / permitting ease & code compliance
17. Supply-chain reliability & material availability
18. Buyer demand / marketability

Follow-up probe after the list:

19. Are there any other important competitive factors missing from this list?
20. Looking at the factors you rated highest, where does ICF have the biggest opportunity to stand out (or biggest weakness)?

Section 4: Customer Demand and Blue Ocean Opportunities (10 mins)

Links to behavioural segmentation (Dolnicar et al., 2018) and Blue Ocean Strategy (Kim & Mauborgne, 2017).

21. From your daily interactions, what are home buyers in high-risk zones (Mobile/Baldwin Counties or similar) asking about most right now (insurance, energy bills, storm resilience, long-term costs, etc.)?

22. What compromises do buyers currently have to make with traditional wood-frame homes?
23. What one or two changes would make ICF the obvious choice for buyers and builders? (Eliminate-Reduce-Raise-Create thinking)
24. Any final thoughts on market gaps or opportunities for an ICF-focused developer?

Closing Script

“Thank you very much for your time and insights — this will be extremely valuable for the dissertation. Is there anything else you would like to add? Would you like a summary of the findings once the research is complete? May I contact you again if I need clarification?”

Appendix D

Primary Data

Table D1

Interview Participant Profiles (N=7)

Source: Data Collected During Interviews

Pseudonym	Role	Years of Experience	Primary Geography	ICF Experience	Interview Duration
P1	Structural Engineer (with an ICF producer and owning a structural engineering firm).	~30 years.	Across the U.S., especially high disaster areas including Florida, Texas, Oklahoma.	Extensive across wood-frame and ICF. Structural design for ICF producers and building assessment. Commercial and residential buildings.	00:35:40
P2	Owner of General Contractor (GC) and Subcontractor Businesses	~15 years in construction, 7 with ICF.	South-Central Texas (San Antonio, Austin, Corpus Christi).	Residential and commercial, ICF framing GC and subcontractor.	01:39:57
P3	Owner of Distributor and Subcontracting Businesses. Previously GC.	~35 years.	Southern U.S. states: Massachusetts, South Carolina, Florida.	Built with almost every material in residential ("slab, stick frame, block, ICF, metal construction") and small commercial with ICF. Tried ICF ~27 years ago, had difficulties, returned to it the last ~17 years.	00:32:17
P4	Electrical Tradesman (working for subcontractor).	5 years in the trades.	Southern Ontario (Muskoka Area).	Trained and works with ICF occasionally.	00:30:01
P5	Real Estate Agent (residential, resale).	12 years.	Southern Ontario, Greater Toronto Area (GTA).	Limited familiarity with ICF.	00:27:35
P6	Technical Director/ Civil Engineer (for producers, ICF associations)	~34 years.	Ontario, Canada. Worked with U.S./Canada national regulatory and ICF bodies.	Extensive career experience with engineering/product management of ICF products.	00:45:00
P7	Director of Commercial	20 years	Oklahoma based, also serving	Extensive career experience with	1:09:18

	Business Development (for a producer), Former Owner of GC and Subcontracting Businesses		surrounding states (ex. Texas, Arkansas)	residential and commercial ICF. Heavily involved in construction, education, and business development of ICF.	
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Table D2

Coded Analysis of Diffusion of Innovation Attributes from Stakeholder Interviews

Source: 2.2.2. *Diffusion of Innovation and Adoption Barriers* and Interview Data

DOI Attribute (Rogers, 2003)	First-Cycle Codes (Saldaña, 2013)	Second-cycle Coding/ Summary	Representative Quotes	Link to Secondary Data / Implications for RQ1
Relative Advantage	“Sound attenuation”, “energy cost savings”, “thermal benefits”, “disaster resilient”, strong against hurricanes and wind, upfront cost, short-term view, invalid criticisms.	Clear long-term benefits (energy, sound, resilience, maintenance), especially in high-risk areas, but upfront costs and speculative/ uninformed criticisms of ICF reduce perceived advantages and hinder adoption.	“Sound benefits...like living in a cave” (P1), “ICF will outperform a 2x6 wall with spray foam insulation by over 55%. That's massive” (P3), “Walls are much stronger... Very durable long term, and will not rot” (P6), “There's a lot of myths and false information” (P2).	Aligns with FEMA (2021) and Ghosh & Bigelow (2025). RQ1: Strong objective advantage exists but is not leading to voluntary demand due to price premium.
Compatibility	More planning, learning curve, “muscle memory” of tradesmen, changing established practices, training required, builders “reluctant to learn, especially when they’re busy”, “don’t want to change”.	Low compatibility as ICF requires changes to business practices breaking the long-established wood-frame ecosystem, supply chains, workforce skills, client expectations, and scheduling. Builders and trades must break “muscle memory” and invest time and money to understand and refine building process. The	“The electrician... walks in and sees foam and concrete and goes, what am I supposed to do? I can't drill that... they're on muscle memory” (P2), “If they got to think they're losing money because they're having to stop, they can't just move fast” (P2), “The contractors, they don't want to change. They got one thing, they got	Supported by Mordor Intelligence (2026) tailwinds (skilled-labour gap). RQ1: Compatibility with existing practices is a major barrier to adoption. Must be addressed through training solutions, streamlined supply chains, and customer demand to

		resistance is strongest among traditional GCs/builders. It is important for manufacturers to support builder projects end-to-end.	their crew. They don't want a new crew. They don't want to do things different. They don't want to. So it's got to be the market that has to push it" (P1),	incentivize change.
Complexity	More planning, "learning curve", "not rocket science", trainable, easy to pick up, perception of difficulty, past ICF product issues, fear of the unknown, unfamiliarity	The actual construction of ICF is not highly complex once the quick learning curve is overcome. Resources and training are available. Perceived complexity comes from business-level hesitancy and unfamiliarity; not technical difficulty for individual workers.	"I can train pretty much anybody to do this" (P2), "once they work with it, they figure out that the learning curve is very fast and it's a very easy product to work with" (P3), "the training isn't too difficult to pick up or pass on" (P4),	Consistent with BlueGreen Building Concepts (2024) and ICF Builder Magazine on experienced builders faster than wood-frame. RQ1/ RQ2: Complexity barrier is perceptual and solvable with training. Creates opportunity for new entrants.
Trialability	Lack of incentive, requires code/ homeowner push, small scale solutions (safe rooms, part of house, pools), slow to start	Difficult for typical builders with homeowner demand or code enforcement. Small ICF pilot projects (e.g. safe rooms, basements, pools) are feasible. However it is not appealing for typical builders/ developers to trial at scale (full-sized homes).	"From a contractor standpoint, you've got to appeal to their interests and what is the benefit to them doing that (ICF)? There really isn't one... The only reason I can think of is a homeowner with money in their pocket saying, I want an ICF home" (P1), "I took two guys that had never seen ICF, didn't even know what it was... they were just concrete guys... in about four and a half days, the three of us stood up all the walls, poured them, and we're out of there" (P2), "Storm shelters... easiest	Relates to Alabama DOI (2025) Fortified Program. RQ2 / RQ3: A new entrant can lower trialability and create an internal experience pipeline by starting with smaller products (safe-rooms and pools), hiring experienced workers, and partnering with early-adopter homeowners.

			entryway possible here” (P7).	
Observability	Lack of awareness, lack of knowledge, misconceptions, past ICF product issues, benefits need to be experienced, “hands-on experience”	Benefits are not readily observable , especially without experiencing it and product awareness is extremely low. Homeowners and builders must physically experience ICF (e.g. sound attenuation, temperature stability) to appreciate advantages. Lack of broad marketing and local prevalence limits diffusion. Requires experiential marketing (walk-throughs, demos) and broader education for public, architects, and GCs.	“If I mention in a group of people ICFs, nobody knows what I’m talking about... nobody’s aware of what they are” (P1), “you can tell somebody about the benefits of ICF all day long... but until they experience it, they don’t fully comprehend it” (P2)	Aligns with Zillow (2024a) climate-risk awareness, but Zillow (2024b) showing consumers prioritizing aesthetic and location. Low ICF visibility and consumers not prioritizing main ICF benefits. RQ1/ RQ2: Core barrier. Blue ocean strategy must prioritize demonstration homes, architect education, and public campaigns.

Table D3

Coded Analysis of Stakeholder Perspectives on Industry Competitive Factors

Source: Table 1 Industry Competitive Factors and Interview Data

Competitive Factor (from secondary matrix)	First-cycle Codes (Saldaña, 2013)	Second-cycle Coding/ Summary	Representative Quotes	Comparison to Secondary Data
CF1: Initial Construction Cost (Price)	Higher premium, mark-ups, builder loses pricing benefits, higher upfront cost, long-term savings, monthly payments	Persistent upfront disadvantage of ICF, especially in the price-sensitive mid-market. Buffer and contingency premiums of subcontractors inflate perceived premium. However spread over a mortgage, monthly costs decrease due to other savings.	“Yeah. It’s going to cost more for upfront... [but] your monthly payment on an ICF is going to be lower than the payment for an equivalent wood-built home” (P1), “we can never remove first cost from the conversation. We just have to get to the point where that’s not the only part of the conversation” (P7).	Mordor (2026), Ghosh & Bigelow (2025).
CF2: Construction	Slower initially,	With experience ICF can be much	“We did a commercial project for a church... this	BlueGreen Building

Speed/ Time on Site	faster once trained, reduces delays, completes multiple steps	faster than traditional methods. Learning curve hurts the first few projects.	thing (ICF) saved us two months of construction time” (P2), “it cuts out about five steps of building from wood frame” (P3)	Concepts (2024)
CF3: Durability / Weather Resilience	Monolithic strength, long-term resilience, temperature moderation, wind resistant, no wood rot, fire break	The strongest ICF differentiator in high-risk zones	“How do I quantify in dollars the strength and the durability of each one [wood-frame and ICF,] and that's where the apples and oranges come from. In order for me to make this wood wall to be able to stand up like this [ICF] one, I've got to add a bunch of stuff to it: steel, some hurricane clips, some tie downs, you got to tie the rod to the top. And all of a sudden, this becomes very expensive.” (P2)	FEMA (2021), Vue (2025), Alabama DOI (2025)
CF4: Energy Efficiency & Operating Costs	Energy savings, thermal efficiency, long-term savings, well insulated.	Major long-term advantage of ICF with a quickly accumulating ROI to overcome initial cost.	“Not even to mention the efficiency of it. ICF will outperform a 2x6 wall with spray foam insulation by over 55%. That's massive” (P3), “I'm saving \$200 a month on my electric bill. And by the way, once I'm done paying off that mortgage, I'm still saving that. It hasn't changed” (P2).	Ghosh & Bigelow (2025).
CF5: Homeowners Insurance Premiums and Insurability	Insurance risk, rising insurance cost, insurance companies driving code change.	A growing expense for homeowners. ICF reduces risk, but benefits depends regionally and on market segments.	“there's tons of (insurance) savings that we had... for some of the other market segments that we briefly talked about with multifamily... That's a big selling factor for them is what those insurance premiums are going to be because now you're tilting it, much larger than a single family home” (P7).	Alabama DOI (2025), Cornelissen et al. (2025).
CF6: Maintenance Requirements Over Long-Term Periods (20-30 years)	No wood rot/ drying, less repairs, thermal stability reduces movement/ cracking	Long-term cost advantage for ICF, particularly when looking at the full life-cycle of a house. Wood-frame loses effectiveness over time.	“most homes in a 30-year period or lifetime period, wood homes are going to experience some kind of rot somewhere. And you just don't have that with ICF” (P1), “As wood dries out over time, it opens up cracks and wind can blow through,	Ghosh & Bigelow (2025).

			especially over long periods of time” (P6).	
CF7: Aesthetic Appeal / Design Flexibility	Any style, curved walls, large openings possible, concrete structural benefits	Design flexibility is an advantage of ICF with it’s concrete structural strength. Important with primary consumers drivers being a modern aesthetic and open concept design.	“Definitely layout. People are looking more for an open concept layout where there are less interior walls, higher ceilings. That’s one of the things that people look [for] and go after” (P5), “The other thing about it is spanning distances... I have several times given people 25 and 30 foot wide windows in their deal. And all we did was add a couple of pieces of rebar. So you can’t do that with wood” (P2).	ICF Builder Magazine (2026)
CF8: Regulatory/ Permitting Ease and Code Compliance	Prescriptive coding, U.S. and Canada integrated, knowledge gaps persist	Strong efforts have been made by the ICFMA to make flat-wall ICF prescriptively coded in the U.S. and Canada. Certain projects can be delayed requiring special review. ICF far exceeds energy codes of many areas.	“especially since the 332 code has come out and really made some things clear” (P1), “So if you’re looking at regions that are already building to more modern and stricter energy codes, it’s a lot of an easier conversation to have to introduce ICF” (P6)	Alabama DOI (2025), FEMA (2021), American Concrete Institute (2018)
CF9: Supply-chain Reliability and Material Availability	No major disruptions, not a major issue, materials must be planned, not as readily available as wood, no standardized block	Supply-chains of ICF materials are established and widely available for distribution. However ICF materials are not always readily available given limited and competing networks.	“If he’s short a block or he’s short a bundle of blocks, well, he’s got to wait for me to ship it in from Oklahoma or Waxahachie. It ain’t like he can just run down to Home Depot or the local hardware store... The other thing is there’s 35 different manufacturers of ICF. So you got to get to the one that matches your blocks. You know, there’s only four two by fours out there, but they’re all the same. So there’s no standardization of the (ICF) product to where you can intermingle” (P2).	Mordor (2026)
CF10: Buyer Demand / Marketability	Low awareness, educating customers, requires	With informed consumers, ICF is highly preferable. But market awareness of ICF	“He bought it Thursday, that day. So my house never made it to the market whatsoever. And he bought it precisely because it was ICF”	Zillow (2024a), Zillow (2024b), U.S. Census

	experience, widespread adoption requires homeowner-driven demand	remains extremely low.	(P3), “And locally in our home market, we see the fruits of that labour right now... we did the groundwork to lay the education” (P7).	Bureau (2024)
Additional: CF11: Sound Attenuation	Like a cave, quiet, sound attenuation	A highly valued benefit of ICF once experienced.	“One that gets overlooked way too much is the sound benefits. I mean, it's like living in a cave. It's so peaceful and quiet and you can get whatever level of quiet you want” (P1).	Consistently mentioned and praised (P1, P2, P3, P6, P7)
Additional: CF12: Location /Neighbourhood	Location of house	One of the most important aspects of home purchasing by consumers.	“the most desirable thing from a customer perspective, it's based on location” (P5).	Zillow (2024a), Zillow (2024b)

Literature Bibliography

- Alabama Department of Insurance & Center for Risk and Insurance Research, University of Alabama. (2025). *Performance of IBHS FORTIFIED Home™ Construction in Hurricane Sally*.
https://www.banking.senate.gov/imo/media/doc/powell_testimony_addendum_10-21-25.pdf
- American Concrete Institute. (2018). *Guide to Residential Concrete Construction* (ACI 332.1R-18). https://www.concrete.org/Portals/0/Files/PDF/Previews/332.1R-18_preview.pdf
- Baldwin County Home Builders Association. (n.d.). *ICF (insulated concrete forms)*.
<https://business.bchba.com/list/category/icf-insulated-concrete-forms-12>
- BlueGreen Building Concepts. (2024). *ICF vs Traditional Wood Construction: Complete 2024 comparison*. <https://bluegreenbuildingconcepts.com/blog/icf-vs-traditional-wood-construction-comparison>
- Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Burnett, E. (2025). Spotlight on Mobile County: Economic Engines. *Business Alabama*.
<https://www.businessalabama.com/spotlight-on-mobile-county-economic-engines-2/>
- Campbell, A. (2024). Building Resilience: How ICF Structures Withstand Natural Disasters. *ICF Builder Magazine*. <https://www.icfmag.com/2024/08/building-resilience-how-icf-structures-withstand-natural-disasters/>
- Cornelissen, S., Heller, D., Weiland, E., & DeLong, M. (2025). *Overburdened: The Dramatic Increase in Homeowners Insurance Premiums and its Impacts on American Homeowners*. Consumer Federation of America. <https://consumerfed.org/wp-content/uploads/2025/03/OverburdenedReport.pdf>
- Dalsace, F., Bonnet, D., & Lange, K. (2025). Customer centricity: Digital Technology and Leadership to the Rescue. *Business Horizons*, 69(2), 217–227.
<https://doi.org/10.1016/j.bushor.2025.02.011>
- Dolnicar, S., Grün, B., & Leisch, F. (2018). *Market Segmentation Analysis: Understanding it, Doing it, and Making it Useful*. Springer. <https://doi.org/10.1007/978-981-10-8818-6>
- Federal Emergency Management Agency. (2021). *Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms (FEMA P-361, 4th ed.)*. U.S. Department of Homeland Security.

https://www.fema.gov/sites/default/files/documents/fema_safe-rooms-for-tornadoes-and-hurricanes_p-361.pdf

Force 5 Walls. (n.d.). *About us*. <https://force5walls.com/about-us/>

Foss, N. J., & Saebi, T. (2017). Fifteen Years of Research on Business Model Innovation: How Far Have We Come, and Where Should We Go? *Journal of Management*, 43(1), 200–227. <https://doi.org/10.1177/0149206316675927>

Gagan, J. P., Gerard, A., & Gordon, J. (2010). A Historical and Statistical Comparison of "Tornado Alley" to "Dixie Alley". *National Weather Digest*, 34(2), 145–155. <https://nwafiles.nwas.org/file/nwafiles/digest/papers/2010/Vol34No2/Pg145-Gagan-et al.pdf>

García-Avilés, J. A. (2020). Diffusion of Innovation. In J. van den Bulck (Ed.), *The International Encyclopedia of Media Psychology*. Wiley. <https://doi.org/10.1002/9781119011071.iemp0137>

Ghosh, S., & Bigelow, B. (2025). Comparative Analysis of Energy Efficiency: Insulated Concrete Form vs. Wood-Framed Residential Construction. *Buildings*, 15(5), 804. <https://doi.org/10.3390/buildings15050804>

Goodman, L., & Zhu, J. (2021). *The Future of Headship and Homeownership*. Urban Institute. https://www.urban.org/sites/default/files/publication/103501/the-future-of-headship-and-homeownership_0.pdf

Guo, J., Prestemon, J. P., & Fannin, J. M. (2025). The Asymmetric Effects of Softwood Lumber Duties, Tariffs, and Mortgage Rates on Housing Payments. *Finance Research Letters*, 86, Article 108844. <https://doi.org/10.1016/j.frl.2025.108844>

ICF Builder Magazine. (n.d.). *ICF Builder Magazine | The Insulated Concrete Form Information Source*. <https://icfmag.com/>

ICF Builder Magazine. (2017). *ICF Industry Comparison Chart*. https://icfmag.com/wp-content/uploads/2017/09/ICF_Comp_Chart.pdf

ICF Builder Magazine. (2020). *Benefits of Living in an ICF Home*. <https://icfmag.com/2020/07/benefits-of-living-in-an-icf-home/>

ICF Builder Magazine. (2021). *ICF Construction Mitigates Building & Operating Costs*. <https://www.icfmag.com/2021/08/icf-construction-mitigates-building-operating-costs/>

ICF Builder Magazine. (2026). *Builder Award Winners*. <https://icfmag.com/builder-award-winners/>

ICF Hub. (n.d.). *Insulated Concrete Forms Directory*. <https://www.icfhub.com/>

- Joint Center for Housing Studies. (2022). *Concentration in Homebuilding Driven by a Few Large Builders*. Harvard Joint Center for Housing Studies.
<https://www.jchs.harvard.edu/blog/concentration-homebuilding-driven-few-large-builders>
- Journeyay, M., LeSueur, P., Chow, W., & Wagner, C. L. (2022). *Physical Exposure to Natural Hazards in Canada (Open File 8892)*. Geological Survey of Canada.
https://publications.gc.ca/collections/collection_2022/rncan-nrcan/m183-2/M183-2-8892-eng.pdf
- Kim, W. C., & Mauborgne, R. (2005). Blue Ocean Strategy: From Theory to Practice. *California Management Review*, 47(3), 105–121.
<https://doi.org/10.1177/000812560504700301>
- Kim, W. C., & Mauborgne, R. (2017). *Blue Ocean Shift: Beyond Competing – Proven Steps to Inspire Confidence and Seize New Growth*. Grand Central Publishing.
- Koh, C. (n.d.). *NAHB Metro Area Economic Dashboard*. Tableau Public.
<https://public.tableau.com/app/profile/catherine.koh6204/viz/NAHBMetroAreaEconDashboard/NAHBMetroAreaEconDashboard>
- Kornelakis, A., & Petrakaki, D. (2025). Technological Innovation, Industry Platforms or Financialization? A Comparative Institutional Perspective on Nokia, Apple, and Samsung. *Business History*, 67, 1983–2008.
<https://doi.org/10.1080/00076791.2024.2377688>
- Lamichhane, S., Parajuli, R., Henderson, J. D., da Silva, B. K., & Tanger, S. M. (2025). Examining Divergence in Softwood Lumber and Timber Prices in the Southern United States. *Forest Science*, 71(2), 183–202. <https://doi.org/10.1007/s44391-024-00012-6>
- Leavy, B. (2018). Value Innovation and How to Successfully Incubate “Blue Ocean” Initiatives. *Strategy & Leadership*, 46(3), 10–20. <https://doi.org/10.1108/SL-02-2018-0020>
- Lemon, K. N., & Verhoef, P. C. (2016). Understanding Customer Experience Throughout the Customer Journey. *Journal of Marketing*, 80(6), 69–96.
<https://doi.org/10.1509/jm.15.0420>
- Lestari, V. (2023). Strategic Approaches to Marketing Management in Contemporary Business Environments. *Advances: Jurnal Ekonomi & Bisnis*, 1(5), 255–268.
<https://doi.org/10.60079/ajeb.v1i5.210>

- Moore, R. (2026). *An Uninsurable Country: States Must Take Action to Fend Off the Looming Home Insurability Crisis (R: 26-02-A)*. Natural Resources Defense Council. https://www.nrdc.org/sites/default/files/2026-02/Insurability_and_CC_R_26-02-A_04_locked.pdf
- Mordor Intelligence. (2026). *Insulated Concrete Form (ICF) Market Size & Share Analysis - Growth Trends and Forecast (2026 - 2031)*. <https://www.mordorintelligence.com/industry-reports/insulated-concrete-form-icf-market>
- National Association of Home Builders. (2025). *Who are NAHB's Builder Members?* <https://www.nahb.org/-/media/NAHB/news-and-economics/docs/housing-economics-plus/special-studies/2025/special-study-who-are-nahb-builder-members-august-2025.pdf>
- National Association of Realtors. (2024). *Home buyers and Sellers Generational Trends*. <https://www.nar.realtor/research-and-statistics/research-reports/home-buyer-and-seller-generational-trends>
- National Association of Realtors. (2025a). Conditions Influencing Neighborhood Choice for Home Purchase in the United States in 2024 [Graph]. In *Statista*. <https://www.statista.com/statistics/505258/factors-influencing-neighborhood-choice-for-home-purchase-usa/>
- National Association of Realtors. (2025b). Methods of Home Purchase in the United States in 2024 [Graph]. In *Statista*. <https://www.statista.com/statistics/507552/methods-of-home-purchase-usa/>
- National Association of Realtors. (2025c). Most Difficult Steps of the Home Buying Process in the United States in 2024 [Graph]. In *Statista*. <https://www.statista.com/statistics/507475/most-difficult-steps-of-home-buying-process-usa/>
- NOAA National Centers for Environmental Information. (2025). *U.S. Billion-Dollar Weather and Climate Disasters*. National Oceanic and Atmospheric Administration. <https://doi.org/10.25921/stkw-7w73>
- Ochsendorf, J., Keith Norford, L., Brown, D., Durschlag, H., Hsu, S. L., Love, A., Santero, N., Swee, O., Webb, A., & Wildnauer, M. (2011). *Methods, Impacts, and Opportunities in the Concrete Building Life Cycle*. MIT Concrete Sustainability Hub, Massachusetts Institute of Technology.

<https://dspace.mit.edu/bitstream/handle/1721.1/105108/MIT%20Buildings%20LCA%20Report%202011.pdf?sequence=1>

- Porter, M. E. (1996). What is Strategy? *Harvard Business Review*, 74(6), 61–78.
- Pruitt, L. C. (2024). Spotlight on Baldwin County: Economic Engines. *Business Alabama*.
<https://www.businessalabama.com/spotlight-on-baldwin-county-economic-engines-2/>
- Pulupula, S., & Dua, S. (2021). Study of the Efficiency of Insulated Concrete Formwork and Similar Fast-Paced Construction Systems in the Indian Context. *Journal of Building Construction*, 3(3), 1–9. <https://doi.org/10.5281/zenodo.5910189>
- Redfin. (2026a). *Baldwin County, AL Housing Market: House Prices & Trends*.
<https://www.redfin.com/county/120/AL/Baldwin-County/housing-market>
- Redfin. (2026b). *Mobile County, AL Housing Market: House Prices & Trends*.
<https://www.redfin.com/county/167/AL/Mobile-County/housing-market>
- Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). Free Press.
- Saldaña, J. (2013). *The Coding Manual for Qualitative Researchers* (2nd ed.). Sage.
- Salvia, V. (2021). An ICF House Proves its Strength Over Decades. *ICF Builder Magazine*.
<https://www.icfmag.com/2021/08/an-icf-house-proves-its-strength-over-decades/>
- Salvia, V. (2024). The California Insurance Crisis. *ICF Builder Magazine*.
<https://icfmag.com/2024/08/the-california-insurance-crisis/>
- Teece, D. J. (2010). Business Models, Business Strategy and Innovation. *Long Range Planning*, 43(2–3), 172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>
- Tesla, Inc. (n.d.). *Model Y Design*. https://www.tesla.com/en_CA/modely/design#overview
- Tilford, M. B. (2009). *Developing for Demand: An Analysis of Demand Segmentation Methods and Real Estate Development* [Master's thesis, Massachusetts Institute of Technology]. MIT DSpace. <https://dspace.mit.edu/handle/1721.1/54863>
- Tracey, M. D. (2025). NAR 2025 Profile of Home Buyers, Sellers Reveals Market Extremes. *National Association of Realtors*. <https://www.nar.realtor/magazine/real-estate-news/nar-2025-profile-of-home-buyers-sellers-reveals-market-extremes>
- Urban Institute. (n.d.). *Alabama: Forecasting State and National Trends in Household Formation and Homeownership*. <https://www.urban.org/policy-centers/housing-finance-policy-center/projects/forecasting-state-and-national-trends-household-formation-and-homeownership/alabama>
- U.S. Bureau of Labor Statistics. (2025). *Mobile, AL Economy at a Glance*. U.S. Department of Labor. https://www.bls.gov/eag/eag.al_mobile_msa.htm

- U.S. Census Bureau. (n.d.). *Census Regions and Divisions of the United States* [Map].
https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf
- U.S. Census Bureau. (2024). *Framing: Single-Family Completed*. Characteristics of New Housing. https://www.census.gov/construction/chars/xls/framing_cust.xls
- U.S. Census Bureau. (2025a). Median Sales Price of New Homes Sold in the United States from 1965 to 2024 (in 1,000 U.S. dollars) [Graph]. In *Statista*.
<https://www.statista.com/statistics/199895/median-sales-prices-of-new-homes-sold-in-the-us-since-1965/>
- U.S. Census Bureau. (2025b). *Median Sales Price of New Homes Sold in the United States from 1965 to 2024 (in 1,000 U.S. Dollars)*.
https://www.census.gov/construction/chars/xls/soldprice_cust.xls
- U.S. Census Bureau. (2025c). *U.S. Census Bureau Building Permits Survey* [Interactive visualization]. <https://www.census.gov/library/visualizations/interactive/bps-new-privately-owned-housing-unit-authorizations.html>
- U.S. Census Bureau. (2025d). Average Size of Floor Area in New Single-Family Houses Built for Sale in the United States from 1975 to 2024 (in square feet) [Graph]. In *Statista*. <https://www.statista.com/statistics/529371/floor-area-size-new-single-family-homes-usa/>
- Vue, E. (2025). Building for Resilience: Adapting Construction to Withstand Natural Disasters. *ICF Builder Magazine*. <https://icfmag.com/2025/08/building-for-resilience-adapting-construction-to-withstand-natural-disasters/>
- York, J. M. (2018). Putting Lean Startup into Perspective: A Novel Approach for Discovering and Developing a Successful Business Model. *Archives of Business Administration and Management*, 2018 (Issue 01), Article ABAM-104.
<https://doi.org/10.29011/ABAM-104.100004>
- Zillow. (2024a). Climate Risks Considered When Shopping for a Home in the United States in 2024 [Graph]. In *Statista*. <https://www.statista.com/statistics/1615818/climate-risks-considered-when-shopping-for-a-home-usa/>
- Zillow. (2024b). Most Important Home Features According to Homebuyers in the United States in 2024 [Graph]. In *Statista*.
<https://www.statista.com/statistics/1021512/important-features-among-home-buyers-by-child-status-usa/>