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Framework for Resolving the Affordable Living Problem in Georgia

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Abstract
The high cost of housing is becoming one of the primary issues that every interest group is concerned with; they want to do something about it but fail to. The problem is multi-faceted and cannot be solved using a traditional problem-solving approach. The federal government defines housing as affordable when it consumes no more than 30 percent of a household's income. Reviewing the makeup of the median sales price of a median house built in Cobb County, Georgia, and comparing that to the median income, One can realize that the median household is paying more than 42 percent of their income on housing alone, which is not "affordable" based on the federal government's definition. By studying this problem and looking at all the components that lead to and make up the sales price of a single-family home, this long-range research aims to provide a framework that makes practical recommendations to address the affordability problem without meddling and altering the mainstream of how the Real Estate business is conducted and with minimal Government intervention. The problem-solving approach will be looking at a holistic approach, which includes the cost of the developed land, proximity to jobs and services, size of the house, and quality of life in general, etc. As a fundamental part of this long-range research, a survey titled "Housing Affordability: Insight to use GenAI" encompasses five distinct sections, each dedicated to a specific aspect of housing affordability and the potential role of generative AI (GenAI) in addressing these challenges. The survey meticulously assesses over twenty factors across various dimensions, including financial regulations, land use policies, market dynamics, construction methods, and the impact of lifestyle trends on housing affordability. Furthermore, it evaluates the efficacy of multiple GenAI-driven solutions aimed at mitigating these challenges, with a focus on enhancing affordability and efficiency in the construction industry. This comprehensive approach, involving the participation of fifty company representatives, ensures a holistic understanding of the multifaceted issues surrounding housing affordability and the innovative potential of GenAI to offer viable solutions.

Keywords
Housing Affordability, Affordable housing, Generative AI

1. Introduction

By definition the federal government defines housing as affordable when it consumes no more than 30 percent of a household's income. Therefore, to define affordability, we will be reviewing all the components that lead to that ratio. As a nominator, we will be looking at what makes up the median mortgage of a home, and as a denominator, we will use the median household income in that location. We will limit our recommendation to reflect the general public without getting to the details of the various economic strata of society.

In the quest to delineate the barriers to affordable housing, this study scrutinizes the multifaceted elements comprising housing affordability, particularly emphasizing construction and land costs, total development expenses, the eventual selling price, and the implications on the median household. By examining Cobb County as a case study, excluding the City of Atlanta, to mitigate the distortion from multi-family zoned lots, we offer an illustrative analysis that underscores the challenges faced in achieving affordable housing within this locale.

Our methodology involves a detailed examination of the median housing costs by multiplying the average house size by the median cost per square foot, yielding an illustrative figure in Cobb County of $285,600 for a 2100-square-foot residence. Further, an exploration into the median land cost, derived from an analysis of single-developed lot transactions within the county in 2023, reveals a median cost of $115,000. This precise selection of Cobb County aids in providing a focused insight into single-family housing costs without the skew from higher-valued multi-family zones.

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The comprehensive total development cost, incorporating construction and land expenses alongside carrying costs — calculated with a modest annual interest rate over a six to eight-month period — culminates in $416,624. This figure includes an average 12 percent markup to cover general conditions, overhead, profit, and an additional five percent for real estate brokerage fees, propelling the asking price to $494,616.

An analysis of the financing aspect reveals that with a conventional down payment, the amortization of the remaining balance over 30 years at a six percent interest rate necessitates a monthly payment of $2,817. When incorporating property taxes and insurance, the total monthly payment (PITI) escalates to $3,313. Given the median household income in Cobb County at $94,244, the ratio of mortgage payment to income significantly exceeds the 30 percent threshold defined by the federal government for housing affordability.

This study proposes that for housing to be deemed affordable in Cobb County, either a substantial increase in median household income to $132,537 or a reduction in the median home price to $360,000 is imperative. The current economic framework and inflationary pressures render such adjustments challenging, thereby spotlighting the critical need for innovative approaches in housing policy and development strategies to bridge the gap towards affordable housing. This examination not only elucidates the financial intricacies involved in housing affordability but also paves the way for a broader discussion on potential policy interventions and market solutions.
As a result, the more logical approach is to bring down the cost of the median house to the $360,000 mark.

In the exploration of innovative strategies to mitigate the escalating median home cost, this paper delves into a non-traditional approach that circumvents predominant market and economic forces. Recognizing the limitations imposed by interest rates and construction costs, which are intricately tied to market dynamics, supply chain issues, and labor force shortages, this study posits that significant reductions in housing affordability may not be achievable through these avenues alone. Similarly, the fluctuating nature of insurance costs and property taxes necessitates further examination within the realm of public policy. Consequently, our focus shifts towards alternative components with the potential for impactful modification.

Developed Lot Cost Reduction: A pivotal factor in this analysis is the cost of developed land. To attain a target sales price of $360,000, it is imperative to drastically reduce the developed lot cost to approximately $10,000. This objective could be realized by establishing residential zones within remote agricultural areas, where raw land costs range between $4,000 and $8,000 per acre. Through strategic development and zoning regulation adjustments to maximize the number of home pads per acre, it is feasible to significantly diminish the overall cost.

Housing Size Optimization: Another avenue for cost reduction is through the adjustment of the house size. Achieving the desired sales price necessitates reducing the house size to around 1300 square feet of heated space, thereby aligning with the principle of optimizing living space efficiency.

Elimination or Reduction of Real Estate Brokerage Costs: Directly influencing the sales price, the elimination or reduction of real estate brokerage costs presents a tangible method to lower the median home cost, enhancing affordability.

Creation of Model Cities: The concept of model cities introduces a transformative living environment where the domicile serves primarily as a space for rest and nourishment. By fostering communities rich in open spaces, social amenities, and essential services within walking distance, this model encourages a lifestyle less dependent on personal vehicular transport, reminiscent of European urban standards.

Enhancing Job Proximity: Strategically enhancing job proximity through two primary mechanisms—relocating major employment hubs to new model cities with initial tax incentives, and relocating certain governmental buildings from high-cost urban areas—offers a dual approach to making housing more affordable while improving quality of life.

Satellite Mass Transit Integration: The implementation of high-speed train systems connecting urban centers to designated rural areas earmarked for development further supports this model, ensuring accessibility and connectivity, essential for the viability of such innovative urban planning.
With all the above in mind, this study advocates for a comprehensive reimagining of urban development and housing affordability, emphasizing the integration of lifestyle, community, and accessibility. Through such a multifaceted

strategy, it is possible to construct a framework for affordable housing that transcends traditional market constraints, offering a sustainable blueprint for future developments.

Concluding the introductory segment of our extensive study, we introduce a meticulously structured survey entitled "Housing Affordability: Insights through Generative AI." This inquiry is segmented into five critical sections, each dedicated to exploring a unique facet of housing affordability challenges and the prospective contributions of generative AI (GenAI) towards mitigating these obstacles. The survey rigorously examines over twenty influential factors spanning a broad spectrum of considerations—ranging from financial regulations, land use policies, and market dynamics to construction methodologies and the evolving impact of lifestyle trends on housing affordability. Furthermore, it delves into the evaluation of various GenAI-driven innovations, aimed at enhancing both affordability and operational efficiency within the construction sector. Through the engagement of fifty company representatives, this study ensures a comprehensive exploration of the complex dynamics at play in housing affordability. It underscores the groundbreaking potential of GenAI in devising effective solutions, thereby setting the stage for a detailed discussion on the intersection of technology and housing economics.

2. Survey tool

The survey for "Housing Affordability: Insights through Generative AI" is structured into several distinct sections, each designed to capture comprehensive insights on various aspects of housing affordability and the potential integration of generative AI (GenAI) technologies. Below is a detailed explanation of each section:

Section A: General Information
This introductory section aims to gather basic professional background information from participants. It includes queries about the respondent's job title, years of experience, area of expertise, type of organization they work for, their primary market focus, roles undertaken in housing projects, and the typical scale of housing projects they are involved in. This data helps contextualize the responses in terms of the diverse perspectives within the construction industry.

Section B: Nationwide Financial Regulating Policies
Focusing on the financial regulatory landscape, this section solicits opinions on how various policies affect housing affordability. It asks respondents to rate their agreement with statements on current financial policies, interest rate adjustments, loan-to-value ratios, and borrowing standards. Additionally, it explores the potential of financial incentives like tax credits, subsidized loans, government grants, and reduced interest rates for affordable housing projects. This section also inquires about the efficacy of GenAI tools in navigating and complying with financial regulations, identifying grants, and offering financial advice.

Section C: Land Use/Zoning Regulations
This part addresses the impact of land use and zoning regulations on housing development and affordability. Respondents are asked to express their views on the preservation of green spaces, public engagement in planning, flexibility in zoning laws, and the balance between environmental preservation and housing supply. It also assesses the potential of GenAI applications in proposing zoning changes, simulating urban designs, analyzing public input, predicting project sustainability, and integrating green spaces.

Section D: Residential vs. Construction Market Dynamics
This section seeks insights into the interplay between residential market demand and construction industry supply. Questions revolve around the adequacy of the current balance to meet affordability needs, the responsiveness of the construction industry to market demand, the impact of innovative construction methods and materials, regulatory barriers, and the necessity of investment in construction technology. GenAI's role is evaluated in forecasting market demand, optimizing construction timelines, analyzing material costs, simulating new development impacts, and identifying housing trends.

Section E: Adaptive Design and Construction Methods and Materials
Delving into adaptive design and innovation, respondents rate their agreement on the construction industry's adoption of adaptive design principles, innovative construction methods, sustainability practices, collaboration among professionals, and regulatory support for innovation. The effectiveness of GenAI in predicting housing needs,

streamlining construction processes, enhancing energy efficiency, optimizing material use, and facilitating modular housing solutions is also examined.

Section F: Lifestyle and Housing Affordability
The final section investigates how lifestyle choices and societal trends influence housing affordability. It covers the demand for sustainable homes, changes due to remote work, urban living preferences, technology-integrated homes, and desires for larger living spaces. The capacity of GenAI to offer tailored housing consultations, provide market insights, advise on eco-friendly modifications, design lifestyle-reflective homes, and gather community preferences is evaluated.

Each section is carefully designed to offer a granular understanding of the multifaceted challenges in housing affordability and to explore how GenAI technologies can be leveraged to propose innovative solutions, reflecting a holistic approach to addressing this pressing issue.

3. Survey results and discussion

Nationwide Financial Regulating Policies: The results indicate a mixed level of agreement on the impact of current financial policies on housing affordability. Some respondents strongly agree that these policies significantly influence housing affordability, while others either agree or remain neutral. A smaller number disagree, and an even smaller number strongly disagree. This spread suggests a varied perception of how fiscal regulations, loan-to-value ratios, and borrowing standards affect the cost and purchase of affordable housing.

Respondents evaluated the effectiveness of financial incentives for affordable housing. The data shows a general consensus that tax credits for developers, subsidized loans for low-income buyers, government grants for sustainable building practices, and reduced interest rates for affordable housing projects are beneficial. The levels of agreement range from strong to neutral, with strong agreement being the most common response for government grants and reduced interest rates.

The graph (Fig.1) reflects respondents' opinions on the effectiveness of Generative AI (GenAI) in providing solutions to financial regulation challenges in housing. The responses are varied, with no single category dominating. Participants rated different potential applications of GenAI, such as financial advising, regulatory compliance assistance, and identifying and applying for housing grants and subsidies. The agreement ranges from strong to neutral, indicating a cautious optimism about the role of GenAI in navigating the complex landscape of housing finance.

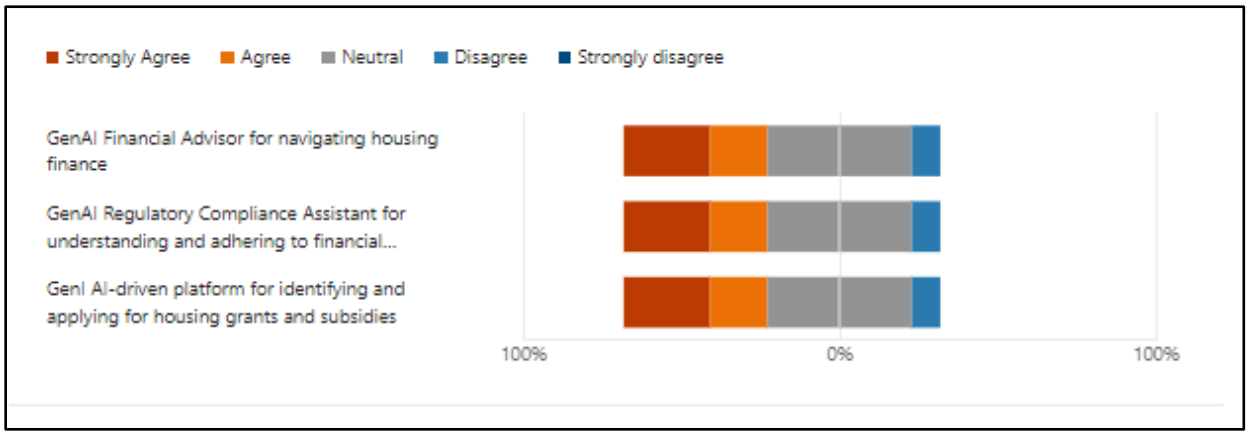

Fig. 1. Effectiveness of GenAI to Support Nationwide Financial Regulating Policies

Open-ended asked respondents to describe their experiences or observations on the impact of financial regulations on housing affordability. The word cloud generated from the open-ended responses highlights frequent terms like "housing stock," "interest loans," "housing market," and "housing prices." The text responses indicate that while some participants observe negative impacts due to regulatory changes, others point out specific policies that have led to

positive developments. Some responses note the challenges such as higher interest rates and strict borrowing standards making housing less affordable, while others mention the role of government regulations in addressing these issues.

In summary, the survey results reveal a nuanced view of financial regulations and incentives' impact on housing affordability. Respondents recognize the importance of current financial policies and the potential of financial incentives and GenAI tools in addressing affordability. However, there's also a level of caution and variability in opinions, indicating the complexity of these issues and the necessity for further study and dialogue among professionals. The responses highlight a clear acknowledgment of the significant role that both traditional financial instruments and emerging technologies like GenAI could play in enhancing housing affordability.

Land Use/Zoning Regulations: The majority of respondents agree or strongly agree that preservation of green spaces should be prioritized, public engagement in land planning is effective, and there is a need for flexibility in zoning laws to foster innovative housing solutions. However, there is a more mixed response regarding whether current land use regulations effectively balance neighborhood character and expanding supply, with a significant number neutral on this statement. Opinions on the frequency of new land use regulations are also varied, with responses spread across agreement levels.

The responses (Fig.2) demonstrate a general belief in the potential of GenAI to contribute positively to land use planning and housing affordability, with a notable number of respondents strongly agreeing or agreeing with each proposed application. There is, however, a level of skepticism or neutrality toward GenAI's ability to analyze public input on land use plans, suggesting the need for further exploration into the practical application of these tools in real-world scenarios.

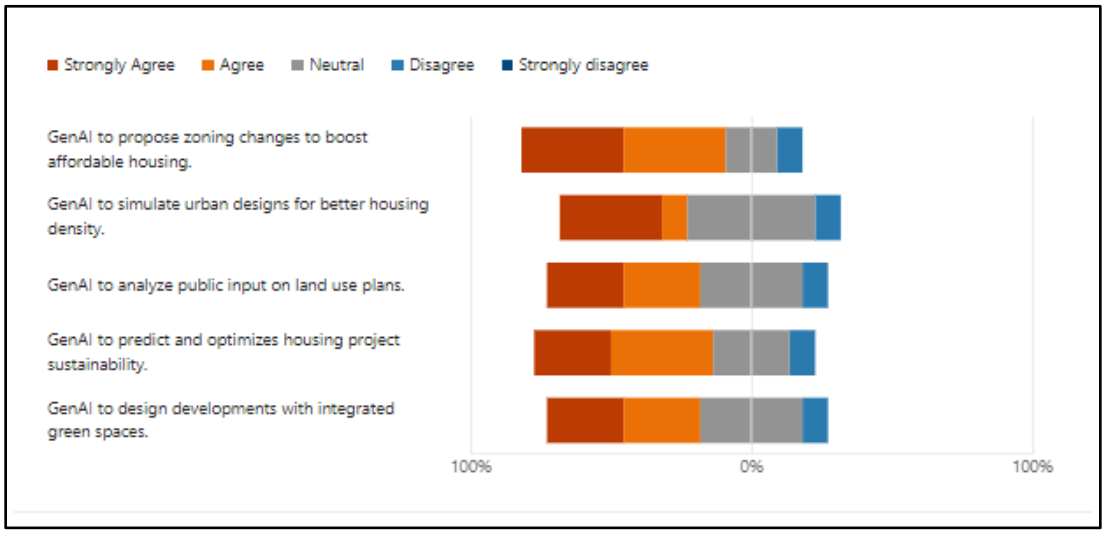

Fig. 2. Effectiveness of GenAI to Support Land Use/Zoning Regulations issues.

The open-ended responses and associated word cloud identify critical challenges and opportunities presented by current land use regulations in relation to housing affordability. Key terms such as "housing crisis," "regulations," "affordable options," and "strict zoning" suggest that respondents observe both positive and negative impacts of land use regulations on housing affordability. Issues like the preservation of trees, the necessity of smaller houses, the importance of creative solutions, and the current unaffordability of housing are mentioned, reflecting a broad range of views on the topic.

Residential vs. Construction Market Dynamics: Professionals see land use and zoning regulations as significant factors in housing affordability, with a general consensus supporting the potential benefits of integrating GenAI into this aspect of urban planning. However, the responses also reveal a complex landscape where regulations can both help and hinder housing affordability, depending on their implementation and flexibility. The potential for GenAI to optimize and enhance land use planning processes is acknowledged, but its practical effectiveness remains a subject for further investigation and development.

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The responses indicate varying levels of agreement regarding the current balance between residential demand and construction supply. Respondents agree or are neutral about whether this balance is adequate to meet the needs, suggesting there is no strong consensus. There is, however, a general agreement that the construction industry is quick to respond to changes in residential market demand, and there's recognition of the need for increased investment in construction technology and automation.

The results (Ref. 3) reflect varying opinions on the effectiveness of GenAI in forecasting residential market demand for strategic housing development planning and optimizing construction project timelines. The responses skew towards agreement and strong agreement on GenAI's potential in these areas, indicating a positive view of its application for improving efficiency and foresight in the construction industry.

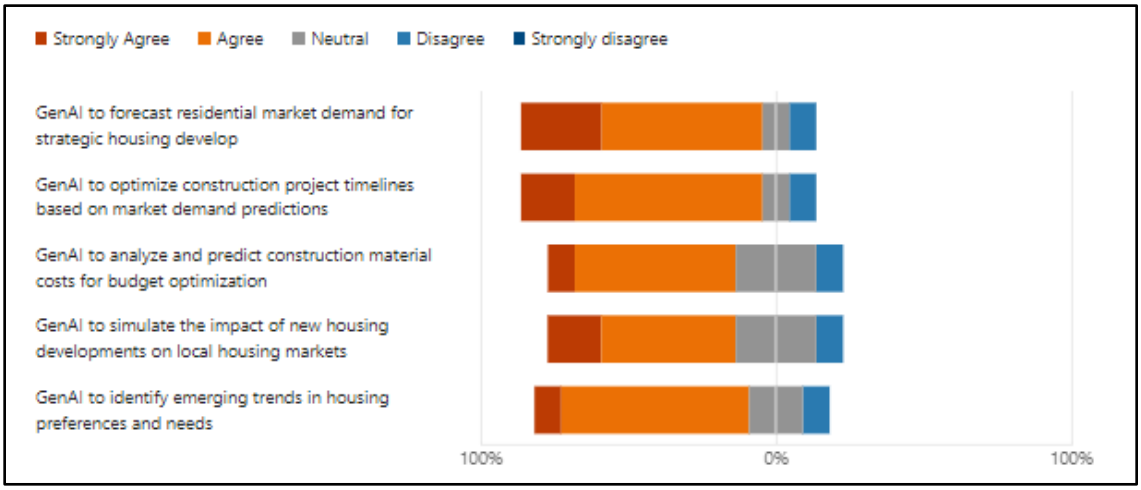

Fig. 3. Effectiveness of GenAI to Support Planning for Residential vs. Construction Market Dynamics

Respondents shared their perceptions of the dynamics between residential market demand and construction industry supply. The text responses highlight several issues, including too much regulation, making affordability difficult, a lack of enough supply to meet high demand and fluctuating material costs tied to economic changes. Some responses indicate that market demand will likely crash after certain events, like elections, suggesting concerns about market stability. Others point to a low construction supply, leading to higher prices and less affordability.

In summary, Section D captures professionals' views on the construction industry's dynamics, its responsiveness to market demand, and the implementation of technology and innovation. The results indicate that there is a perception of the industry being responsive and somewhat adaptable, with the potential for GenAI to enhance planning and forecasting. The open-ended responses underscore the complexities of market dynamics and the critical role of regulatory environments and technological advancements in shaping the industry's ability to meet housing demand effectively.

Adaptive Design and Construction Methods and Materials: The survey shows respondents' levels of agreement with statements about the construction industry's adaptability and responsiveness in implementing adaptive design and innovative construction methods and materials. The majority of responses range from agreement to strong agreement that the industry is effective at incorporating adaptive design principles, with a strong leaning towards acknowledging the rapid adoption of methods to improve housing affordability. However, there is a more balanced distribution of opinions on whether collaboration between architects, engineers, and builders is sufficient to drive the adoption of innovative solutions, with some disagreement present.

This graph (Fig. 4) assessed the perceived effectiveness of various generative AI applications in the construction industry, with respondents indicating their level of agreement. The applications include using GenAI to predict and adapt to housing needs, streamline construction processes, enhance building design for energy efficiency, lower the use of unsustainable materials, and facilitate the adoption of modular and prefabricated housing solutions. Overall,

respondents show a high level of agreement on the potential benefits of these GenAI applications, signaling optimism toward the technology's role in advancing the construction industry.

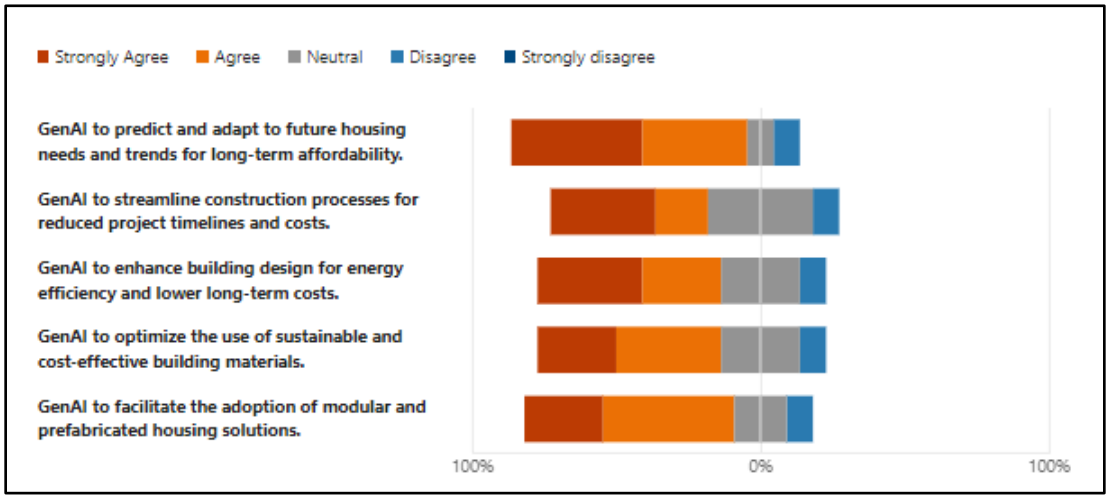

Fig. 4. Effectiveness of GenAI to Support Adaptive Design and Construction Methods and Materials

The open-ended responses provide insights into innovative design and construction methods that could significantly improve housing affordability, along with any perceived barriers to their adoption. Respondents highlight automation in construction processes as having the potential to increase housing affordability by reducing costs and speeding up project completion. They also mention the need for regulatory methods to evolve, suggesting that stable interest rates and renewable resources can play a role in managing market risks. However, some respondents are not qualified to answer, indicating that there is a diversity in the level of knowledge and experience among the survey participants.
In summary, the results from Section E illustrate a general consensus that the construction industry is moving towards more adaptive and innovative practices, with GenAI playing a significant role in this transformation. The industry is recognized for its efforts to adopt new technologies and methods, although collaboration and regulatory challenges are noted as areas that could be improved. The open-ended responses reveal a range of opinions on how innovation could further housing affordability, with a focus on the need for automation, regulatory stability, and the adoption of renewable resources to create more cost-effective housing solutions.

Lifestyle and Housing Affordability: There is a strong belief that the growing demand for sustainable and eco-friendly homes is significantly influencing housing affordability. The shift towards remote work and the trend towards urban living for closer proximity to amenities and work are changing housing preferences and affecting affordability in substantial ways. There is also a notable agreement that the demand for homes with advanced technologies and larger living spaces is impacting the types and prices of housing available.

Survey participants rated GenAI's capability to mitigate the impact of lifestyle trends on housing prices (Fig. 5). The consensus seems to suggest:

- A strong belief in GenAI's ability to offer tailored consultations, provide instant insights into housing market trends, and advise on eco-friendly home modifications within budget constraints.
- There is agreement on GenAI's capability to help design homes that reflect users' lifestyles and to gather community preferences for informing affordable, lifestyle-centric housing solutions.

Respondents provided various observations on lifestyle trends affecting housing affordability. Key points mentioned include:

- Conflicts between people's desires and housing affordability.
- Disinterest in the reliability of chatbots and the challenge of people wanting more than they can afford.
- Recognition of the trend towards more sustainable living and the development of rental markets as viable housing options.
- The influence of remote work and platforms like Airbnb on the housing supply and affordability.

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- The word cloud suggests key themes such as "rental market," "renewable energies," "noticeable surge," and "opinion on homeownership," pointing to areas where lifestyle choices are impacting housing development and affordability.

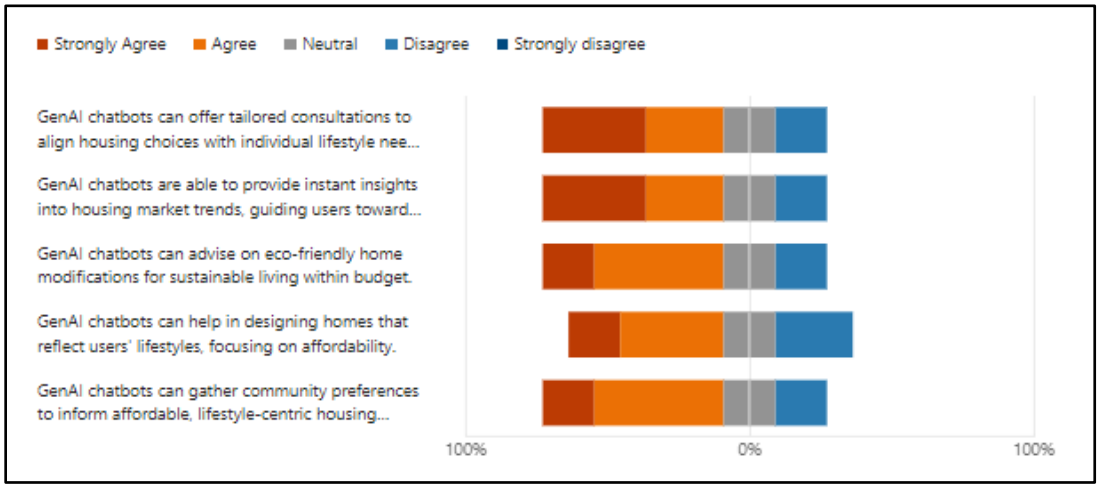

Fig. 5. Effectiveness of GenAI to Support Lifestyle and Housing Affordability

In summary, these responses reveal a complex interplay between lifestyle choices, market trends, and housing affordability. There is a clear recognition that eco-friendliness, remote work, and urbanization are driving changes in housing demands. The potential of GenAI to adapt to and mitigate these changes is acknowledged, with varying levels of optimism about its effectiveness. The open-ended feedback underlines the diversity of opinions and the multifaceted nature of lifestyle trends affecting the housing market, indicating both opportunities and challenges in the sector.

4. Conclusion

In synthesizing the insights gleaned from this study, we conclude that the path to affordable housing is not a single-threaded journey but a multifaceted voyage that requires a harmonious convergence of policies, technologies, and societal shifts. As we have seen, the high cost of housing remains an obstinate barrier to securing the ideal of affordable living. While essential, traditional methods and policies have proved insufficient when faced with this challenge's current scale and complexity. Within this context, the pioneering potential of Generative AI (GenAI) emerges not merely as a tool but as a transformative force capable of redefining the landscape of affordable housing development.

Our investigation, underpinned by rigorous analysis and comprehensive survey results, demonstrates that GenAI holds promise in addressing critical affordability aspects — from refining land use policies and optimizing construction costs to predicting market trends and tailoring homes to evolving lifestyle demands. The diversity of professional insights collected through the survey indicates cautious optimism about GenAI's capabilities, signaling an industry on the cusp of a technological renaissance. Yet, this optimism is measured, tempered by the understanding that GenAI's full potential is yet to be unleashed. Regulatory barriers, market dynamics, and the construction industry's inertia are but a few of the challenges that remain to be navigated. The convergence of technology with traditional construction and real estate business practices demands not just innovation but a cultural shift — a willingness to embrace new methodologies and abandon outdated paradigms.

Looking forward, this study advocates for a bold, concerted effort to integrate GenAI solutions into the fabric of housing development. By doing so, we can envisage a future where affordable housing is not an exception but a norm, undergirded by efficient, responsive, and sustainable practices that serve the needs of all. In conclusion, while the journey toward housing affordability is undoubtedly complex, the insights derived from this research illuminate a path forward — a path paved with innovation, collaboration, and an unwavering commitment to making the ideal of affordable housing a universal reality.

***Disclaimer**: This study report utilized Microsoft Forms for data collection and fundamental analysis, in addition to language improvement facilitated by Grammarly and Advanced Aata Analytics by OpenAI.*