A CONCEPTUAL VIRTUHOME BUSINESS MODEL: TRANSFORMING REAL ESTATE WITH IMMERSIVE TECHNOLOGY FOR ENHANCED PROPERTY EXPERIENCE AND WELLBEING

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ABSTRACT: This paper introduces VirtuHome, a conceptual business model that leverages VR (Virtual Reality) and AR (Augmented Reality) technologies to transform the real estate experience and wellbeing. VirtuHome offers a digital platform and mobile application that allows customer segment (CS) like home buyers and renters, real estate developers, and property investors to explore properties virtually, enhanced branding through technology and foresee the real-time market insight. The platform addresses the key challenges faced by these CS by providing features like immersive virtual tours, interactive AR home staging, and remote live consultations. The methodology applied in this project is the Design Thinking (DT), which involves understanding the CS needs through literature review, benchmarking similar business like iProperty, Property Guru, and interviews. This is followed by ideation, prototyping, and validation using business modeling tools such as the Business Model Canvas (BMC) and Value Proposition Canvas (VPC), Business Environmental Map (EM), and Strategy Canvas (SC) to establish the validated business model of VirtuHome. Key findings reveal the significant potential of VirtuHome in enhancing CS's experiences and wellbeing to improve convenience; optimise costs, time, and energy; and support smarter property decision-makings. Future work includes expanding the platform's features with AI and analytics, and developing a comprehensive business plan based on the validated VirtuHome business model.

KEY WORDS: *Virtual Reality (VR), Augmented Reality (AR), Real Estate, Immersive Virtual Tours, Design Thinking (DT), Business Model*

1. INTRODUCTION

In today's digitally driven world, the property search process still poses significant challenges. While many individuals turn to online platforms to find houses or rentals, the experience is often inefficient and frustrating. Buyers frequently encounter misleading listings, limited visualization, and the burden of physically visiting multiple properties before deciding (Solanki et al., 2023). This inefficiency wastes time, creates stress, and limits accessibility.

For home buyers and renters, the main frustrations involve excessive effort and uncertainty. Virtual tours and AR tools can reduce these issues by allowing users to visualize properties and furniture placement remotely. Research has shown that immersive technologies significantly enhance user engagement and decision-making in real estate transactions (Solanki et al., 2023; Kangda et al., 2023).

For real estate developers, managing repeated site visits and maintaining costly show units poses a challenge. The integration of VR and AR technologies offers a more efficient way to present properties and close deals faster while minimizing operational costs (Sittler, 2017). Developers benefit from a more engaging and sustainable model that allows buyers to preview properties virtually.

Property investors also struggle with comparing multiple properties quickly and effectively. They often lack the time for physical visits. An immersive, data-driven platform can offer remote access to detailed layouts and property analytics, improving their investment decisions (Kangda et al., 2023).

Platforms like PropertyGuru, iProperty, and EdgeProp in Malaysia, and international platforms like Zillow (USA) and Rightmove (UK), support traditional online property browsing. However, they mainly rely on static images and lack interactive experiences. These platforms fall short of allowing users to "walk through" homes or visualize furniture in context.

To solve these issues, VirtuHome proposes a next generation solution using Virtual Reality (VR) and Augmented Reality (AR) to deliver realistic, immersive property experiences. Through digital tours, virtual staging, and live remote consultations, users enjoy a faster, more informative, and environmentally friendly property search process.

2. PROBLEM STATEMENT/OBJECTIVES

The main users who face these problems are:

i) Home Buyers and Renters

- Job-to-do: Find and compare suitable homes quickly, confidently, and remotely.
- Extreme pains: Time wasted visiting unsuitable properties, poor visualization from static photos, uncertainty in decision-making.
- Important gains: A faster, easier, and more visual property search experience that builds confidence and reduces stress. Real estate developers: They want to promote properties and close deals faster. Their problems include spending money on setting up showrooms and dealing with many viewing appointments. They want better ways to show off their properties and reach more people.

ii) Real Estate Developers

- Job-to-do: Market properties efficiently, attract leads, and reduce the cost of physical showrooms.
- Extreme pains: High expenses on setting up and maintaining physical showrooms, slow deal closures, and managing multiple viewing appointments.

- Important gains: Cost-effective, innovative tools to showcase unfinished or empty properties virtually to a wider audience.

iii) Property Investors

- Job-to-do: Market properties efficiently, attract leads, and reduce the cost of physical showrooms.
- Extreme pains: High expenses on setting up and maintaining physical showrooms, slow deal closures, and managing multiple viewing appointments.
- Important gains: Cost-effective, innovative tools to showcase unfinished or empty properties virtually to a wider audience.

3. METHODOLOGY

In this project, we used the Design Thinking (DT) approach to develop our conceptual VirtuHome business model. The DT method helped us understand customer needs, design our solution, and test it. Below are the steps we followed:

i) Empathize – We conducted a literature review, benchmarking of similar companies using the BMC framework, and surveys/interviews to learn about the challenges and problems faced by home buyers, renters, real estate developers, and property investors (CS).
ii) Define – Based on the information collected, we clearly identified the key problems of our customer segments (CS), including their job-to-do, extreme pains, and essential gains. These problems include time wasted during physical visits, difficulty in visualizing properties, and high costs in promoting listings.
iii) Ideate – We brainstormed and created ideas to solve these problems. Our ideas included features like VR virtual tours, AR home staging, and live consultations with agents. We planned to develop these features in a digital platform (mobile app and website).
iv) Prototype – We developed an initial Business Model (BM) for VirtuHome using Business Modelling Tools such as the Business Model Canvas (BMC), Value Proposition Canvas (VPC), Strategy Canvas, and Environmental Map. These tools helped us visualize key elements of the business, identify the unique value proposition, assess the competitive landscape, and understand the broader market environment to ensure a comprehensive and strategic approach to the platform's development.
v) Test/Validation – We conducted interviews and surveys with representatives from each CS to test and validate our initial business model. Based on feedback, we refined and finalized the model to ensure its fit with user expectations and market needs.
vi) Comparison and Strategy Canvas – We used the Strategy Canvas to compare VirtuHome against other platforms, evaluate its sustainability and relevancy from various CS perspectives, and identify unique advantages that make VirtuHome a stronger alternative in the property tech market.

4. LITERATURE REVIEW

4.1. The Fourth Industrial Revolution (4IR) and Its Impact on the Real Estate Industry

The Fourth Industrial Revolution (4IR) represents a transformative period characterized by the integration of advanced technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data analytics, Virtual Reality (VR), and Augmented Reality (AR) into various industries, including real estate. These innovations have significantly reshaped business landscapes by enhancing efficiency, optimizing resources, and improving decision-making processes. Digitalization, as defined by Deloitte (2013), involves changing business models by improving processes through information and communication technologies. In the real estate sector, this means leveraging digital tools to enhance customer experiences, streamline operations, and create new business models.

One of the dominant megatrends of 4IR is the widespread adoption of AI and big data in market analysis and forecasting. As highlighted by Yang (2024), big data analytics has improved real estate market forecasting accuracy by 15.2%, enabling more precise investment strategies and risk assessments. Additionally, AI has been instrumental in property management, increasing operational efficiency by 17.6% and reducing maintenance costs by 13.2% (Yang, 2024). These trends suggest that data-driven decision-making is becoming a crucial component of real estate market sustainability.

Another key aspect of 4IR is the integration of IoT in smart buildings, leading to improved building automation, energy efficiency, and security. IoT applications have resulted in a 10.3% reduction in energy consumption and a 17.5% improvement in security measures (Yang, 2024). These advancements contribute to sustainable and cost-effective building management, addressing both economic and environmental concerns in real estate development.

The adoption of VR and AR in real estate is another crucial element of digital transformation. VR allows potential buyers to explore properties remotely through immersive virtual tours, enhancing accessibility and reducing the need for physical visits. AR, on the other hand, enables users to visualize potential renovations or furniture layouts in real-time, aiding decision-making. As noted by Catella (2016), PropTech, which combines property and technology, is driving innovation in the real estate sector by leveraging such technologies to create new business models. However, challenges remain, including technological barriers and user adoption, as the fast-paced development of technology requires continuous adaptation and investment in new tools.

As digital technologies continue to evolve, their impact on business models and customer experiences in real estate will only grow. The real estate sector must embrace these changes to remain competitive and innovative, leveraging technologies such as AI, big data, IoT, VR, and AR to enhance operations and meet evolving customer needs. The integration of these technologies is not only reshaping the industry but also reinforcing the importance of digital transformation in business resilience. Future advancements in 4IR will likely drive further innovations, ensuring the long-term competitiveness and efficiency of the real estate industry.

4.2. Reskilling and Upskilling for the Digital Economy

Upskilling and reskilling of Malaysia's bottom 40% income group (B40), especially retrenched workers, are crucial in the Fourth Industrial Revolution (4IR) context. The Malaysian government has introduced several initiatives for poverty eradication and inclusive economic development through skills development, especially. Darmalinggam et al. (2022) emphasized the need for job opportunities and career advancement for the B40 segment under the Shared Prosperity Vision 2030. Yet, between the presumed impact of such interventions and actual effects, there is a wide gap, usually accounted for by the absence of synchronism between governmental initiatives and the dynamics of the labor market.

A core issue relates to the changing work ecosystem spurred by the Fourth Industrial Revolution (4IR), which calls for the development of higher and new skill sets. Many in the B40 group are either unemployed or working in subordinated jobs due to their lack of corresponding competencies. Darmalinggam et al. (2022) elaborate that key fields such as data sciences, green accounting, and forensic economics require immediate attention in the form of establishing training programs to address contemporary industry needs. These observations support the importance of low-cost training aimed at addressing the changing needs of the digital economy.

These obstacles have been faced by the government of Malaysia, which has addressed them through certain detailed initiatives. These include an EmpowerHER Digital program formed by the Malaysia Digital Economy Corporation (MDEC) in coordination with Digital Nasional Berhad (DNB) to enhance digital skills and empower women who fall under the B40 income group. The project offers a sequence of workshops and talks by industry experts, along with access to online platforms like Shopee and TikTok, for hands-on access to aspects of online branding, financing, and digital business operations. Such interventions are an excellent illustration of a comprehensive policy intervention aimed at the creation of digital literacy and entrepreneurial skills among underrepresented groups.

Yet there are numerous challenges in translating these efforts into fruitful results. A majority of Malaysian manufacturing SMEs face hindrances to the adoption of Industry 4.0 technologies, and financial limitations and shortages of skilled manpower are prominent concerns (Wan Fauziah Wan Yusoff et al., 2023). The hindrances are not limited to manufacturing but have been noted among other industries in the process of being digitalized.

The results indicate that government assistance, through the provision of financial assistance, technical advice, and advisory services, is effective in stimulating greater involvement throughout the industry regarding upskilling programs. Furthermore, the effectiveness of training programs is also heavily reliant on the extent to which they align with the actual demands of the industry. Darmalinggam et al. (2022) write that a "discontinuity" typically occurs between employer expectations and training content, diminishing the overall success of reskilling initiatives.

Enhanced digital upskilling and reskilling initiatives will both generate more employment possibilities for B40 groups and boost innovative developments in digital transformation sectors. People gain better economic participation power by possessing relevant talents that include data literacy and smart technology

knowledge along with digital marketing expertise. A better integration of training curriculum to industry requirements will help Malaysia develop an inclusive workforce alignment with modern needs.

4.3. The Business Potential of VR and AR in Real Estate

The integration of Virtual Reality (VR) and Augmented Reality (AR) technologies has significantly transformed the real estate sector, offering innovative ways to market properties, engage potential buyers, and streamline decision-making processes. These technologies are reshaping traditional practices by introducing immersive, interactive experiences that enhance customer satisfaction while reducing operational costs.

4.3.1. Market Growth and Adoption of VR and AR

The adoption of VR and AR is becoming increasingly prominent in real estate, reflecting a broader trend toward digital transformation across industries. These technologies allow users to engage with property listings in dynamic, interactive ways, replacing static images and conventional tours. As Solanki et al. (2023) note, “Technology offers new exciting and meaningful opportunities, which in return, change the face of how users work and deliver ever-more complex projects for the customers” (p. 19). The rising adoption of these tools indicates a shift in consumer expectations and business strategies within the property sector.

4.3.2. Cost Efficiency and Accessibility

VR and AR offer cost-saving advantages by reducing the need for physical property staging, travel, and repetitive site visits. In a cost comparison analysis, Solanki et al. (2023) found that using VR for property tours can reduce marketing expenses by up to 45% compared to traditional methods (p. 31). Furthermore, VR enhances accessibility by enabling remote property exploration, which is especially beneficial for out-of-town buyers or during movement restrictions. Hussin and Abu Bakar (2023) emphasize this benefit by stating, “VR technology brings increased accessibility, particularly for remote buyers” (p. 390).

4.3.3. Enhanced Customer Experience and Competitive Edge

The immersive nature of VR and AR technologies allows potential buyers to explore and visualize properties more effectively. Users can interact with digital spaces in real-time, adjusting layouts or design elements to better understand the living experience. Hussin and Abu Bakar (2023) highlight this advantage, stating that “VR technology captivates potential buyers by offering an immersive and interactive property viewing experience” (p. 390). Solanki et al. (2023) also note that such immersive simulations create smoother workflows between clients and real estate firms, thereby improving customer engagement and decision-making processes (p. 22).

4.3.4. Future Potential with AI and Data Analytics

The integration of VR with emerging technologies such as Artificial Intelligence (AI) and data analytics holds promising prospects for the real estate industry. AI can assist in providing personalized property recommendations, automating routine processes, and generating actionable insights from user data. Hussin and Abu Bakar (2023) encourage further exploration into how VR influences long-term buyer behavior and purchasing decisions (p. 397), while Solanki et al. (2023) suggest that

incorporating AI will enhance efficiency across all stakeholder interactions in real estate transactions (p. 21).

4.4. Business Model Canvas (BMC) Analysis of Benchmark Applications: PropertyGuru and iProperty

4.4.1. PropertyGuru

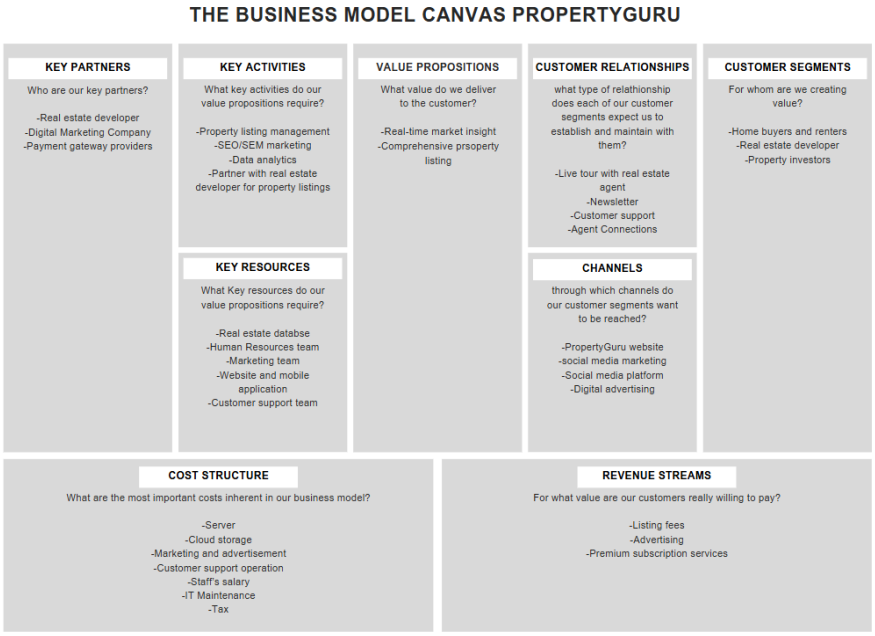


Fig. 1. Business model canvas for PropertyGuru

PropertyGuru is a leading online property platform headquartered in Singapore and operates across Southeast Asia. It offers a large range of property listings, market data, and financing tools. Its strength lies in a user-friendly interface and advanced search filters. PropertyGuru serves a wide range of customer segments including home buyers and renters, property investors, and real estate and developers. Its value lies in providing reliable listings and real-time market insight in order to help users make smarter property decisions. The platform effectively uses digital channels such as its website, mobile apps, and social media to reach and engage users. It builds relationships through personalized alerts, newsletters, AI-driven property suggestions, and direct communication with agents.

Revenue primarily comes from listing fees, advertising packages, and premium services offered to agents and developers. This ensures a consistent income stream. To support these services, PropertyGuru relies on key resources such as its comprehensive property database, solid IT infrastructure, and its strong brand reputation. Operationally, the platform focuses on listing management, search optimization, customer service, and leveraging user data analytics to enhance performance. Its key partners like real estate agencies, developers, financial institutions, and marketing firms help maintain the platform's relevance and service quality. The cost structure reflects significant investments in tech development, server maintenance, marketing, and support teams, ensuring the platform remains competitive and reliable.

Compared to iProperty, PropertyGuru demonstrates a broader regional presence and stronger AI integration for personalization. However, both platforms still lack immersive features like virtual walkthroughs or AR-based visualization. While iProperty excels in delivering localized content and engaging property news to its Malaysian audience, PropertyGuru leads in automation and tech-based recommendations. These insights allow PropertyGuru to position itself as a next-generation solution that not only matches the strengths of these platforms but also introduces novel features to improve property decision-making through immersive experiences.

4.4.2. iProperty

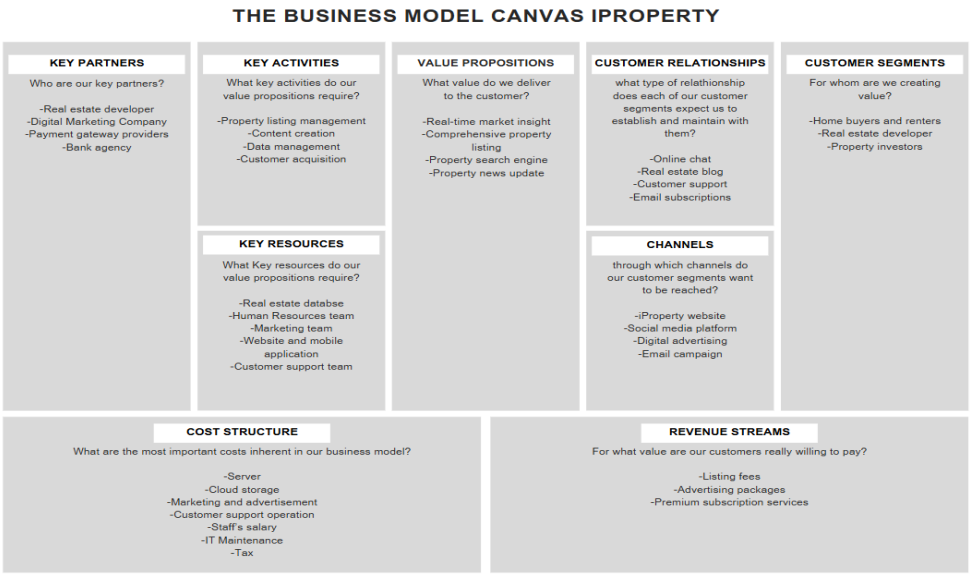


Fig. 2. Business model canvas for iProperty

iProperty focuses primarily on the Malaysian market and caters to customer segments including first-time home buyers and renters, property investors, and real estate developers. Its value proposition is almost the same as PropertyGuru, which appeals particularly to users seeking trusted information in a Malaysian context. IProperty connects with its customers through a mobile-responsive website, social media platform, and digital advertising. iProperty builds customer relationships by offering tools like real estate blogs, email subscriptions, and easy access to agent contact information (iProperty.com.my, 2023). Revenue is generated through premium listing services and advertising packages for developers and agents. iProperty also occasionally partners with banks and insurance providers to provide financing-related advertisements. In terms of key resources, it relies on its brand recognition in Malaysia, a robust property database, and content creators focused on market trends and Real estate advice. The key activities include managing property data, providing customer support, marketing, and creating localized content that resonates with the Malaysian audience.

Key partnerships include real estate agencies, developers, local media, and event organizers for property expos. These partnerships strengthen iProperty's local credibility and engagement. The cost structure is largely composed of platform maintenance, staff salaries, marketing expenses, and partnership deals. While iProperty excels in offering localized insights and news, it lacks advanced

interactive tools such as VR tours or AR-based staging. Compared to PropertyGuru, iProperty is more narrowly focused but leverages that specialization well. However, both platforms still rely on traditional listing experiences. This creates a gap for a VR or AR based technology to fill by combining the regional outreach and automation of PropertyGuru with the local engagement and trusted content of iProperty, enhanced through immersive technologies.

5. INITIAL BUSINESS MODEL (BM) – USING BMC & VPC

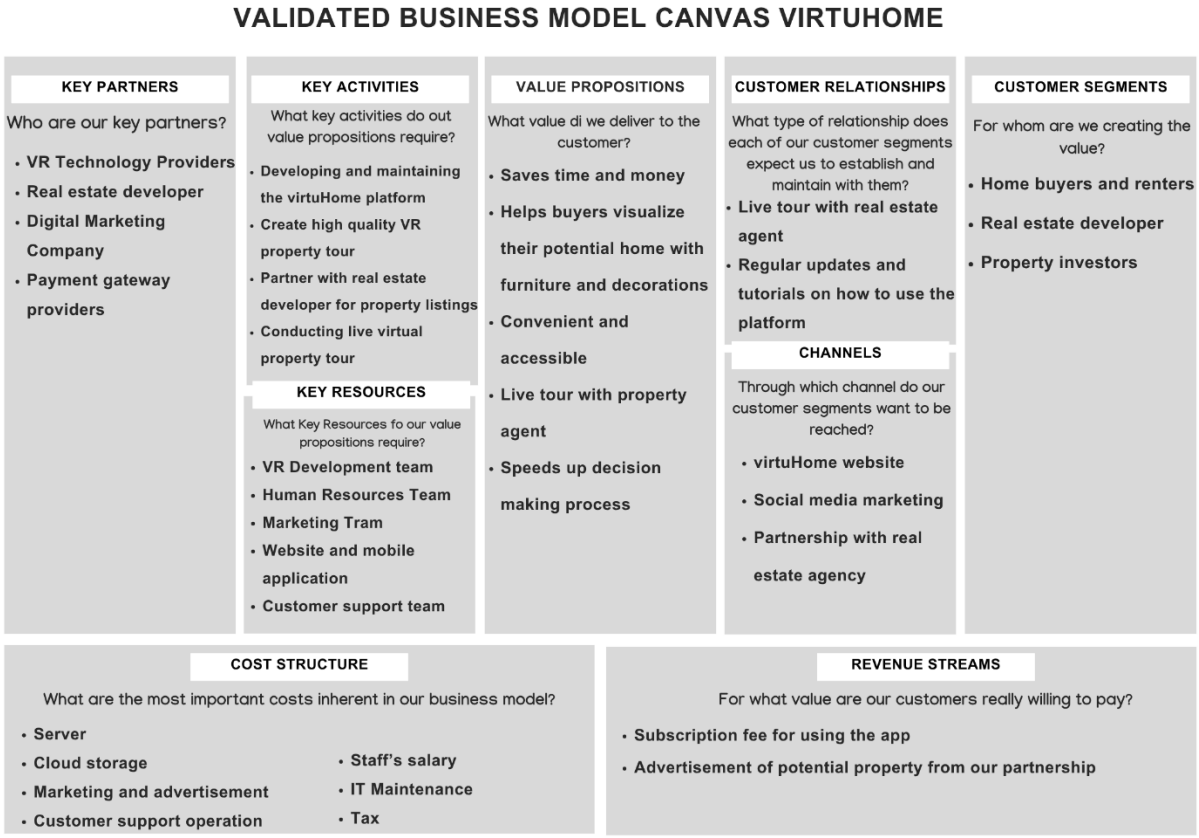


Fig. 3. Initial Business Model Canvas for VirtuHome

Based on the Literature Review conducted above, the initial Business Model, using BMC framework, is as shown in Fig. 3 above.

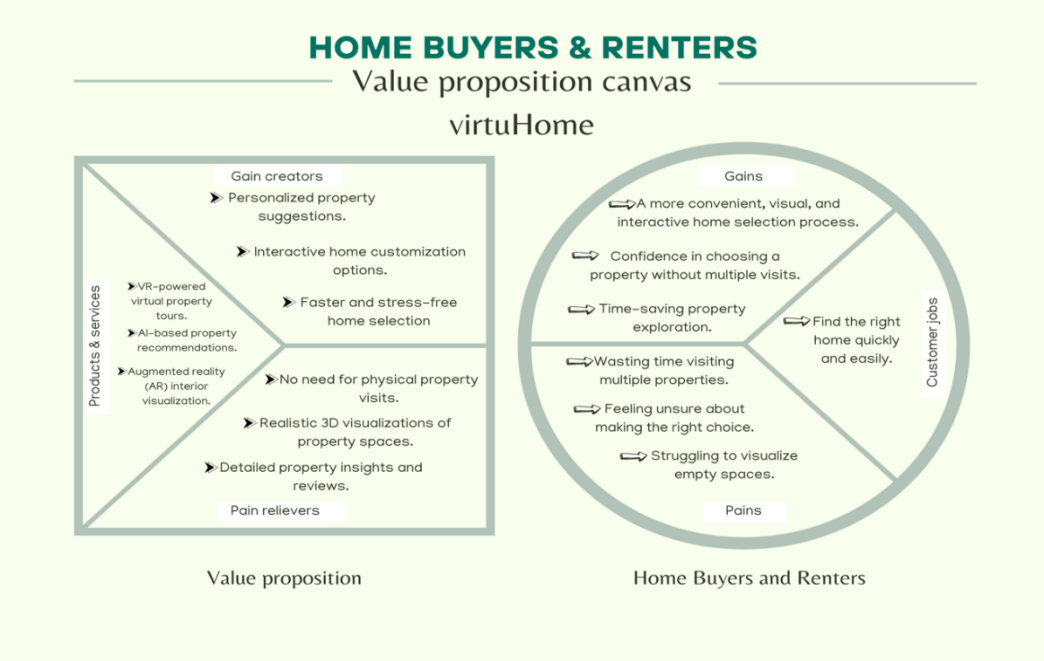


Fig. 4. Value Proposition Canvas for Home Buyers & Renters

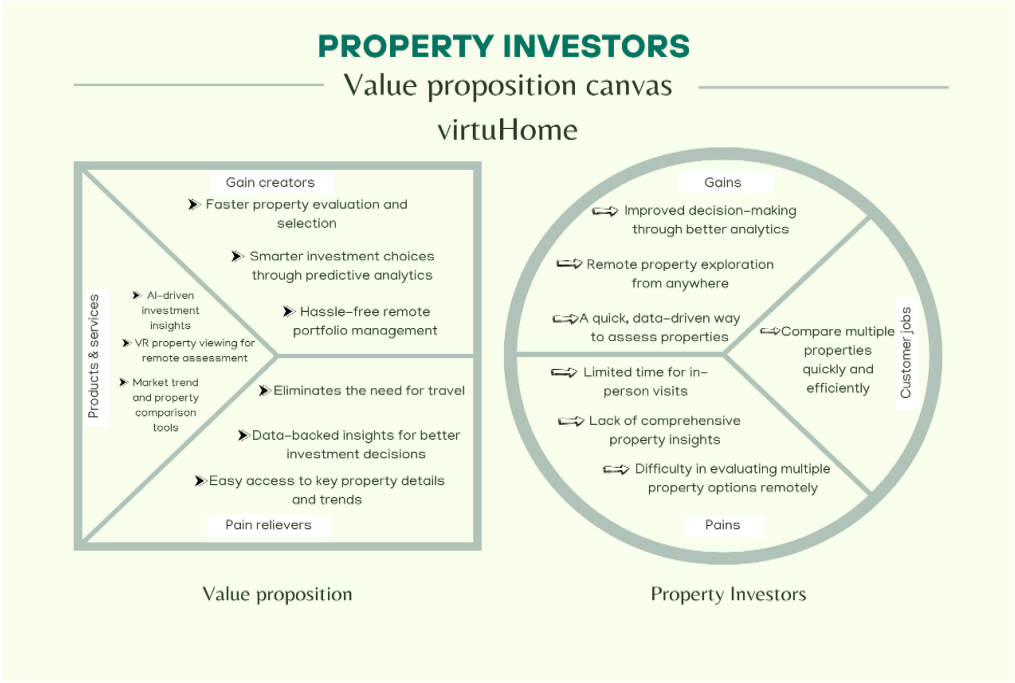


Fig. 5. Value Proposition Canvas for Property Investors

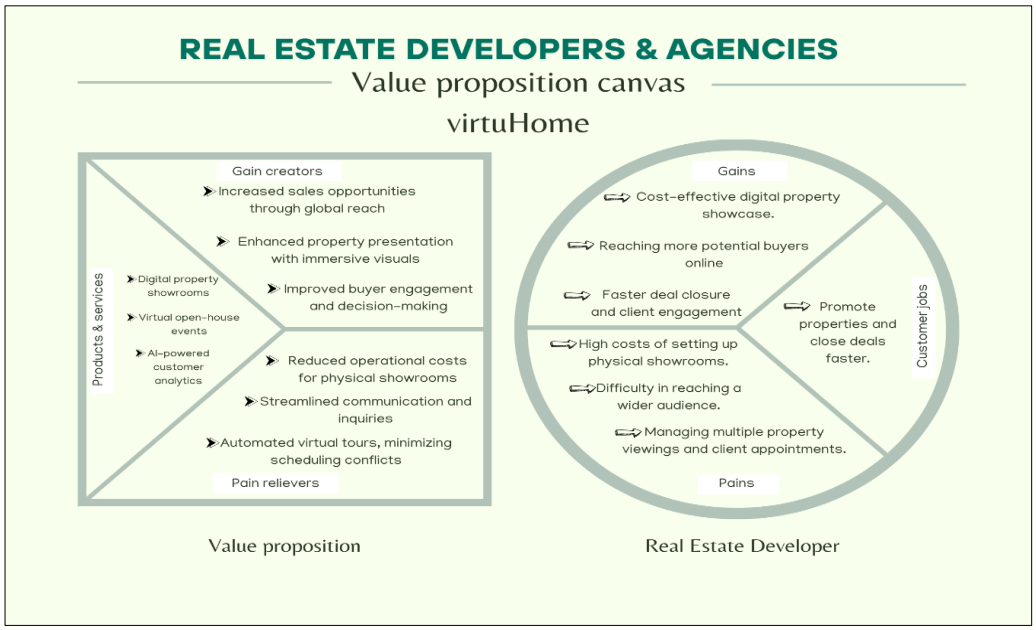


Fig. 6. Value Proposition Canvas for Real Estate Developers & Agencies

6. CONDUCT VALIDATION OF INITIAL BM & KEY FINDINGS

To validate our initial business model, an online survey with only 9 questions has been distributed through social media and 20 responses from our potential customer segments. In the following, we will be discussing the summary of the responses.

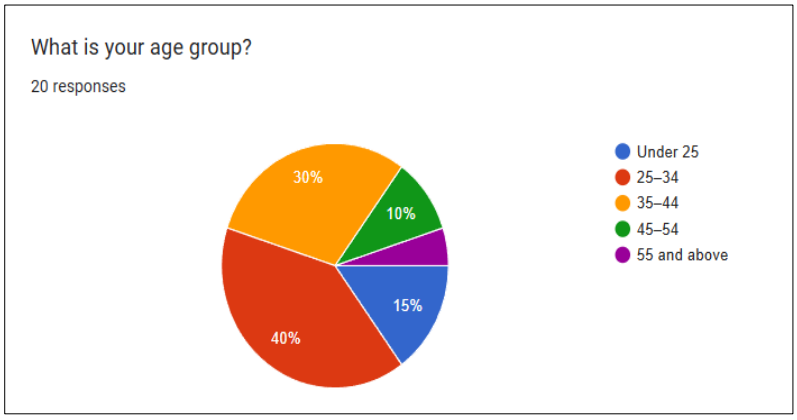


Fig. 7. Summary of Question 1

Fig. 7 shows the summary of question 1. The data shows that many respondents are in the 25–34 age group (40%), followed by 35–44 (30%). These two groups together represent 70% of our sample and are considered digitally active, financially independent, and likely to be exploring property ownership, renting, or investing. These users value features such as real-time insights, virtual viewings, and interactive experiences, which are aligned with VirtuHome's core offerings. The 15% of respondents under 25 suggest interest among younger adults, possibly first-time renters or buyers doing early market research. The lower engagement from older age groups (45 and above) could imply that these users prefer traditional property methods or require more user-friendly tech interfaces.

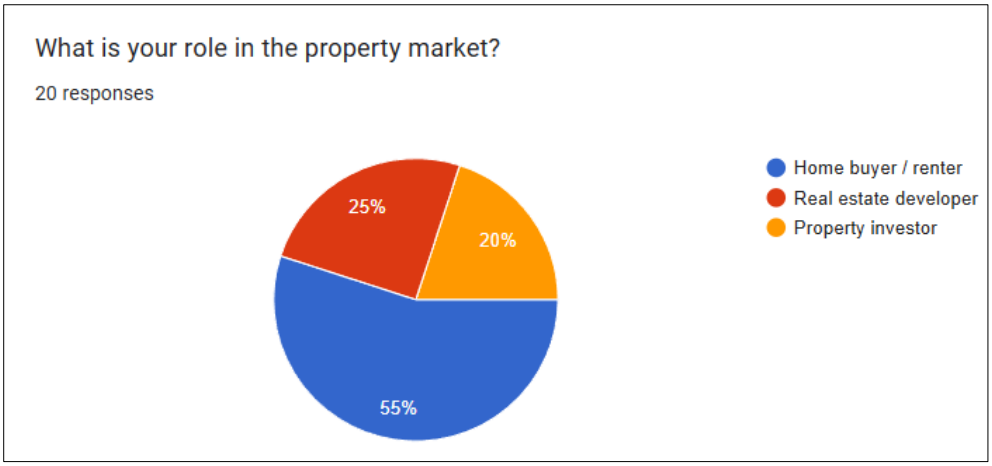


Fig. 8. Summary of Question 2

Fig. 8 shows the summary of question 2. The largest portion of respondents are home buyers or renters (55%), confirming that the platform should prioritize features that assist with searching, viewing, and evaluating properties. Real estate developers (25%) and property investors (20%) also form significant customer segments, suggesting a dual focus on both Business-to-Consumer and Business-to-Business user needs. For developers and investors, advanced tools like real-time market insight and promotional 3D tours are key value drivers.

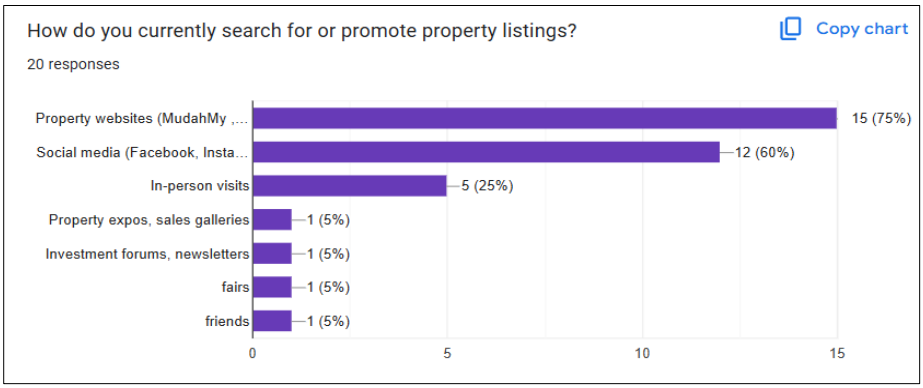


Fig. 9. Summary of Question 3

The above Fig. 9 shows the summary of question 3. Respondents mainly use property websites such as iProperty and MudahMy and social media platforms like Facebook and Instagram. Some still rely on traditional channels like in-person visits and property fairs. This shows that while the market is shifting toward digital tools, there is still fragmentation in the user experience. It presents an opportunity for VirtuHome to position itself as an all-in-one digital property platform that offers centralised browsing, comparison, and communication while saving users time and effort.

Fig. 10. Summary of Question 4

Fig. 10 shows the summary of question 4. One of the most frequently mentioned pain points was the difficulty in comparing properties effectively. Many home buyers explained that current platforms often lack detailed side-by-side comparisons, which makes it hard to evaluate which property best fits their needs. This leads to frustration and decision fatigue, especially for buyers who are short on time or unfamiliar with the market. Another key issue was the amount of time wasted visiting multiple properties physically. Home buyers and renters noted that they often had to schedule multiple viewings, only to find that the properties did not meet their expectations. This process is not only time-consuming but also inefficient, especially for people with busy schedules or those relocating from another city or country. A third major challenge involved the inability to visualize property layouts or space utilization. Even with photos, many buyers felt it was hard to imagine how a property would look in real life or whether it would fit their furniture and lifestyle. This lack of spatial awareness often results in hesitation or indecision.

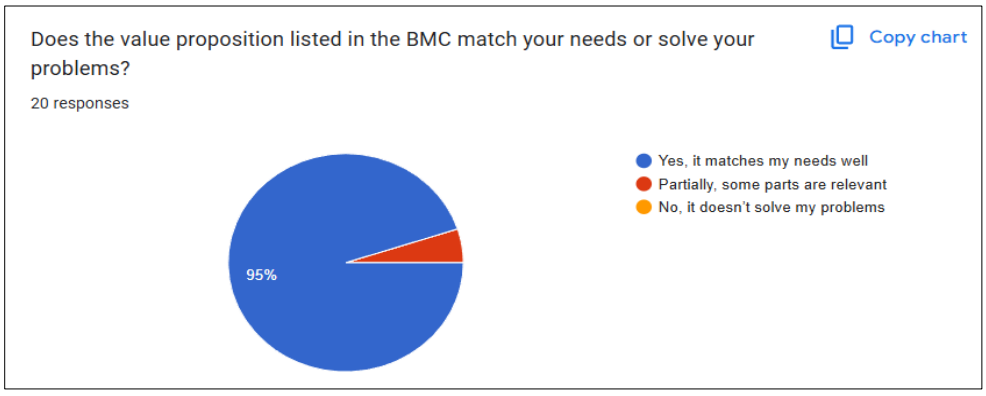


Fig. 11. Summary of Question 5

Fig. 11 shows the summary of question 5. Nearly all respondents agreed that the value propositions listed in our BMC match their needs or solve their problems. This is a strong validation of our early business assumptions. It shows that users resonate with features such as virtual home tours, real-time insights, smart search tools, and property comparison features. Only one user said the solution was only partially relevant, which indicates a possible need for more personalized features to fully meet all user expectations.

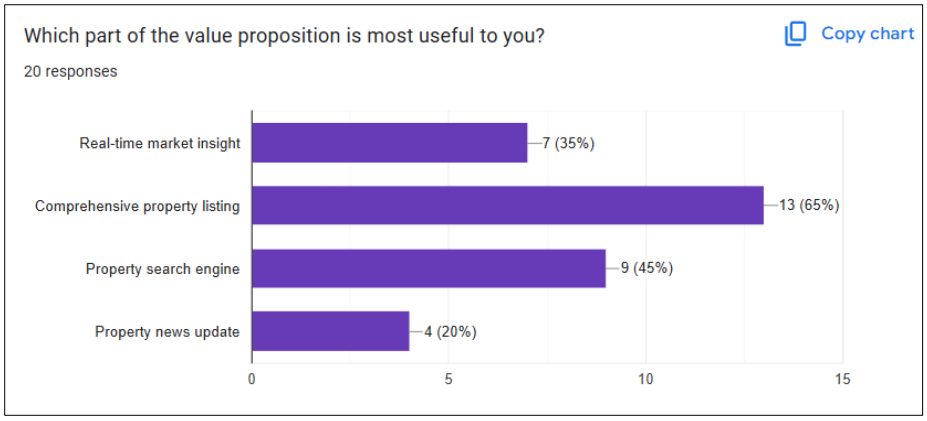


Fig. 12. Summary of Question 6

Fig. 12 shows the summary of question 6. respondents identified comprehensive property listings and the property search engine as the most useful parts of VirtuHome's value proposition, followed by real-time market insights and property news updates. Buyers and renters value rich, accurate listings and advanced filtering to save time and improve decision-making, while investors and developers prioritize real-time data to assess market trends and opportunities. The results confirm that VirtuHome's core features align well with user needs across segments and should remain the main focus for development, especially in delivering a smart, user-centered property browsing experience.

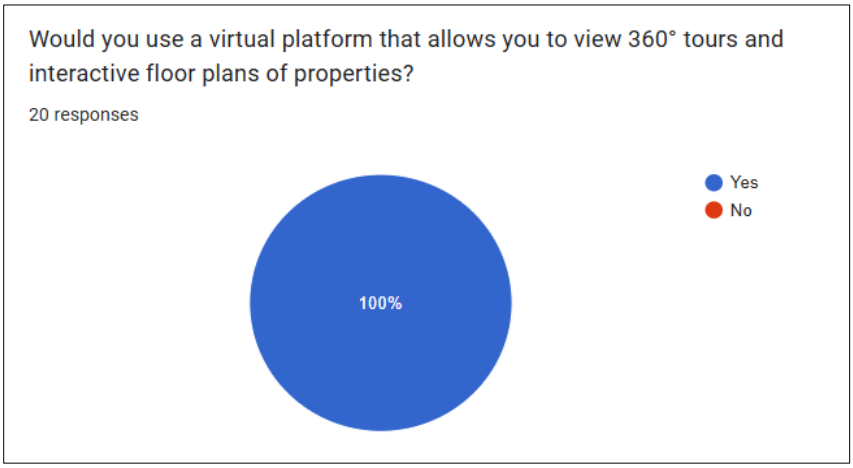


Fig. 13. Summary of Question 7

Fig. 13 shows the summary of question 7. all respondents answered "Yes" when asked if they would use a virtual platform with 360° tours and interactive floor plans, indicating strong enthusiasm and readiness for immersive digital property experiences. This unanimous support validates one of VirtuHome's core features and confirms that users are not only open to using virtual viewing tools, but actively prefer them over traditional methods. It highlights a clear market demand for more efficient, visual, and remote-friendly solutions, especially among busy professionals, long-distance buyers, and tech-savvy users.

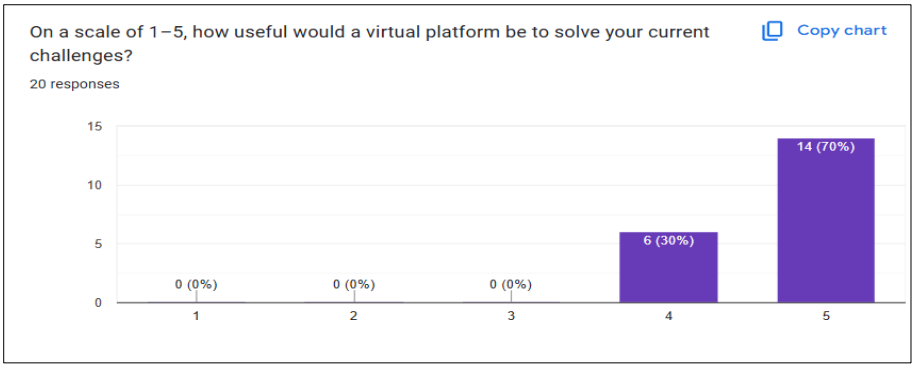


Fig. 14. Summary of Question 8

Fig. 14 shows the summary of question 8. Most users gave a rating of 4 or 5, with the majority choosing 5, indicating that they find VirtuHome to be very useful or extremely useful. This strongly suggests that our platform addresses real frustrations in the market and offers clear value to the user. This high score reinforces our belief in the platform's potential to disrupt traditional property search and marketing, especially for time-pressed or long-distance users.

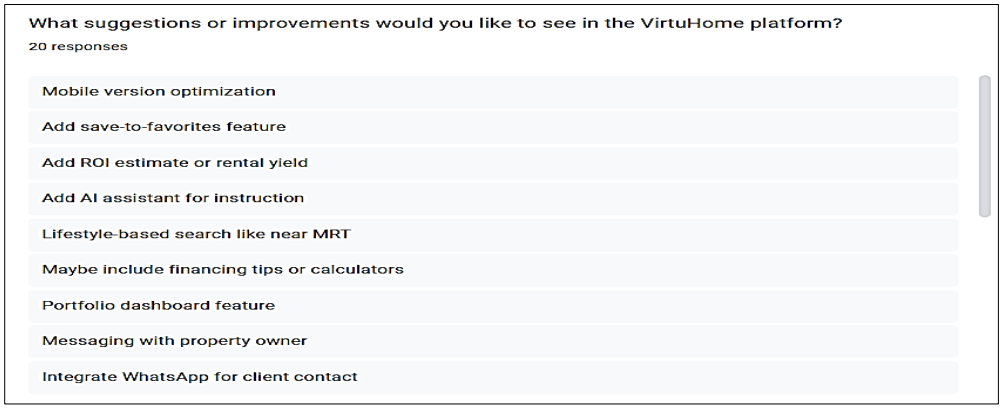


Fig. 15. Summary of Question 9

Fig. 15 shows the summary of question 9. Participants offered thoughtful and diverse suggestions, including adding features such as rent calculators, ROI estimates, mobile optimization, and even an AI assistant. These ideas reflect a desire for personalized, data-driven tools and a smooth user experience. It also indicates potential for premium feature development or a tiered subscription model. These suggestions not only validate our direction but also provide a useful roadmap for future updates and scalability.

7. BMC FRAMEWORK

7.1. Validated Conceptual Business Model

Following our validation surveys on the initial business model, we learned that our customers are generally satisfied with the business model and that changes were made when necessary. As a result, Fig. 16 depicts the validated business model canvas for VirtuHome.

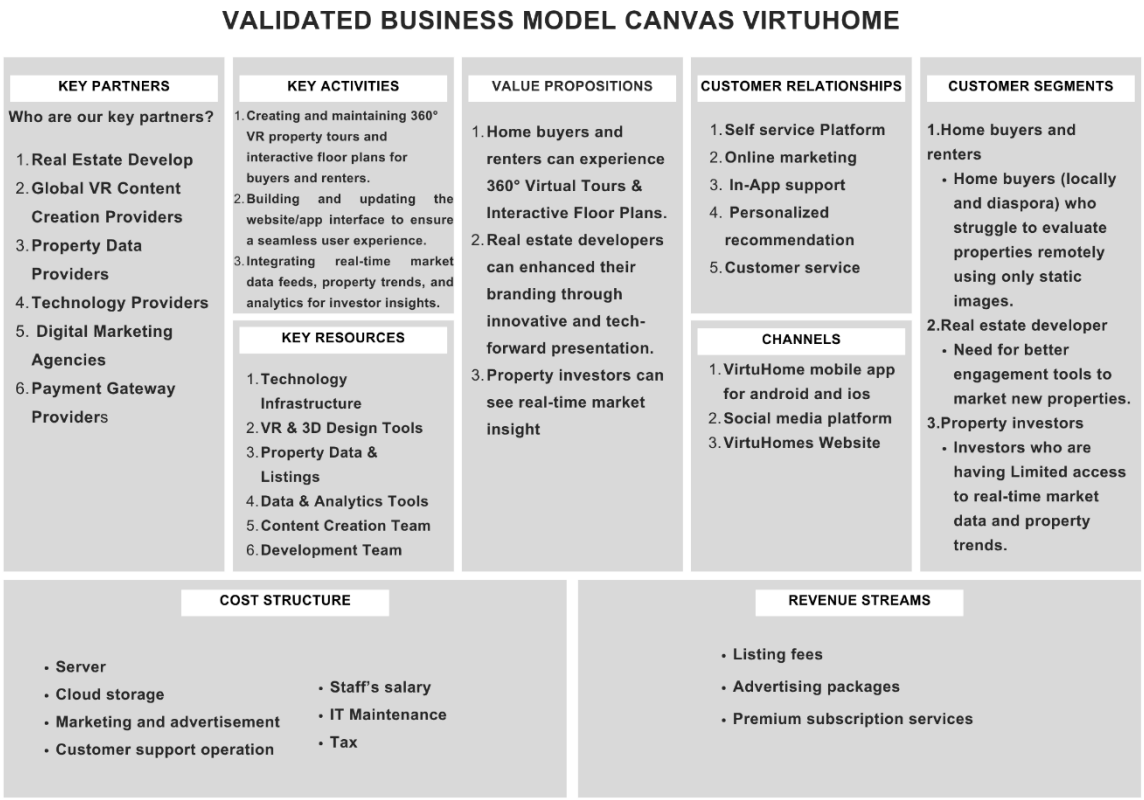


Fig. 16. The validated business model canvas of VirtuHome

7.1.1. Customer Segments (CS)

The customer segments targeted by VirtuHome consist of individuals and businesses who are directly involved in the property market and would benefit from a more digital, immersive, and efficient experience when searching for or showcasing properties. These are home buyers and renters who are struggled to visualize layouts or spaces of the property just from the image, real estate developer that need better engagement tools to market their properties, and property investors who are having limited access to real-time market data and property trends.

7.1.2. Value Proposition (VP)

A value proposition is a service or feature offered to suit the needs and wants of certain customer segments. The values provided to each customer type are as follows:

a. Home Buyers and Renters: VirtuHome offers home buyers and renters a seamless digital property experience with 360° virtual tours and interactive floor plans. This helps users explore and evaluate properties remotely, saving time and effort. With our platform, they can compare spaces easily, visualize layouts, and make informed decisions from the comfort of their homes. This reduces stress and increases confidence during the home search process.

b. Real Estate Developers: For real estate developers, VirtuHome serves as a powerful marketing tool to enhance brand image through innovative and tech-forward presentations. By listing their properties with immersive visuals and

interactive floor plans, developers can attract more attention, increase engagement, and reach a wider audience, especially among tech-savvy home seekers. This results in improved visibility and faster conversion rates.

c. Property Investors: VirtuHome provides real-time market insights to help property investors monitor trends, assess opportunities, and make better investment decisions. Our platform offers data-driven tools, smart comparisons, and up-to-date listings that support strategic planning. This enables investors to minimize risk and maximize returns while keeping up with market movements efficiently.

7.1.3. Channels (CH)

Channels explain how we want to reach out to and engage with potential and new customers to provide a value proposition. VirtuHome will communicate with its customer groups via the VirtuHome mobile app, which is available for both Android and iOS devices. Customers can also interact with us through our official social media platforms such as Facebook, Instagram, and X (formerly Twitter). Additionally, the VirtuHome website and the mobile app will serve as a central hub for browsing listings, accessing features, and staying updated on property trends and insights.

7.1.4. Customer Relationships (CR)

VirtuHome is a digital property platform that focuses on building strong and lasting relationships with its customer segments by offering a seamless and user-friendly experience. The platform encourages user engagement and trust through various customer relationship strategies. VirtuHome offers a self-service platform, allowing users to search, view, and compare properties independently. It uses online marketing channels such as social media, email campaigns, and search engine optimization to attract new users and retain existing ones. Additionally, the app includes in-app support for real-time assistance, and offers personalized recommendations based on user preferences and browsing behavior to enhance the experience. To ensure satisfaction, VirtuHome provides reliable customer service through multiple channels including in-app chat, email, and social media to resolve any inquiries or issues efficiently.

7.1.5. Revenue Streams (RS)

The first is listing fees, where real estate developers pay to have their properties featured on the platform, particularly when using enhanced options like 360° virtual tours. The second stream comes from advertising packages, which allow property owners and developers to promote their listings more prominently through homepage banners or featured sections. Lastly, VirtuHome offers premium subscription services for both individual users and businesses, giving them access to advanced features such as analytics dashboards and priority listing placements.

7.1.6. Key Resources (KR)

The platform relies on key resources such as technology infrastructure, VR and 3D tools for creating virtual tours, property data, and analytics systems. A skilled content creation team and development team are also essential to maintain and enhance the platform.

7.1.7. Key Activities (KA)

VirtuHome's main activities include creating virtual tours, developing apps and websites, and integrating real-time property data to provide an engaging and informative user experience.

7.1.8. Key Partnerships (KP)

To operate effectively, VirtuHome relies on a network of key partnerships. Key partners include real estate developers and agencies for listings, VR content creators for virtual tours, property data providers, tech infrastructure providers, digital marketers, and payment gateway services for secure transactions.

7.1.9. Cost Structure (CS)

VirtuHome incurs various operational costs necessary to maintain and scale the platform. Main costs include server and cloud storage, marketing, customer support, staff salaries, IT maintenance, and taxes, all required to ensure the platform runs smoothly and continues to grow.

7.2. Business Environmental Map

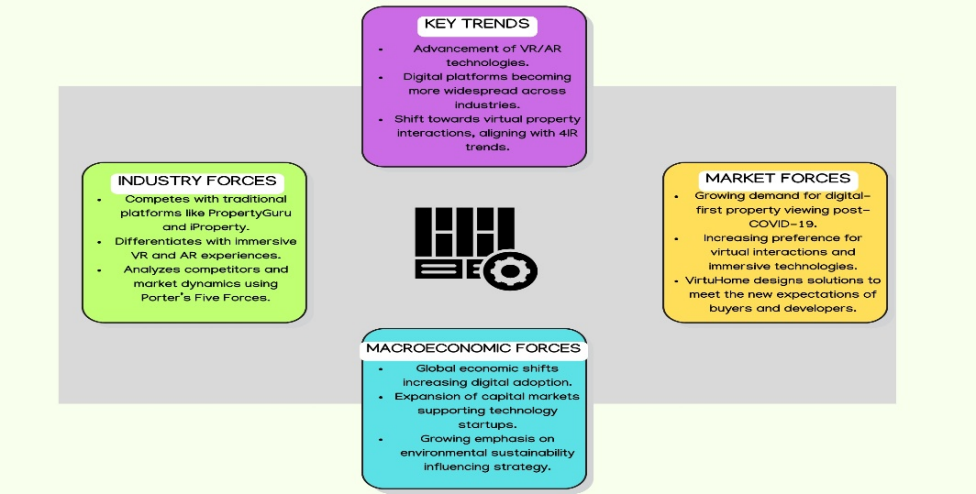


Fig. 17. The business model environmental map of VirtuHome

The Business Model Environment Map (EM) is a strategic tool that VirtuHome uses to scan and analyze external factors that influence its business model. The EM covers four key external forces:

7.2.1. Market Forces

In terms of Market Forces, VirtuHome responds to a growing demand for faster, digital-first property viewing experiences, especially after the COVID-19 pandemic, where physical viewings became limited. By understanding the increasing customer preference for virtual interactions and immersive technologies, VirtuHome designs solutions that match the new expectations of buyers, developers, and investors. As highlighted by Amarsy (2015), identifying customer trends and needs is critical for shaping a strong business model.

7.2.2. Industry Forces

For Industry Forces, VirtuHome operates in a competitive environment dominated by traditional online property listing platforms such as PropertyGuru and

iProperty. However, unlike these platforms that primarily offer static photos and basic videos, VirtuHome differentiates itself with immersive VR and AR experiences. VirtuHome strategically evaluates its competitors, potential market entrants, substitutes, and partnerships to remain competitive.

7.2.3. Key Trends

The Key Trends affecting VirtuHome include the rapid advancement of VR/AR technologies, the adoption of digital platforms across industries, and the changing behaviour of property buyers who now prefer virtual interactions over physical site visits. As noted by Amarsy (2021), staying aware of technological, regulatory, and societal trends is essential for maintaining relevance. VirtuHome aligns itself with these emerging patterns, especially trends related to the Fourth Industrial Revolution (4IR).

7.2.4. Macro-Economic Forces

Finally, under Macro-Economic Forces, VirtuHome acknowledges the wider economic conditions that impact its business. Factors such as increased digital adoption due to global economic shifts, the expansion of capital markets supporting technolgy startups, and a growing emphasis on environmental sustainability influence VirtuHome's strategy. Understanding macro-economic forces such as global market conditions, capital markets, and resource availability is crucial for building resilient and profitable businesses.

The Environment Map (EM) is important because it helps businesses identify and understand the external factors that could affect their operations. By continuously reviewing these factors, businesses can determine market changes, competitive threats, and economic shifts. With this ability, businesses will be able to survive in a constantly evolving environment. This ensures that businesses are not just reacting to changes but are prepared to take advantage of any opportunities arising.

7.3. Strategy Canvas

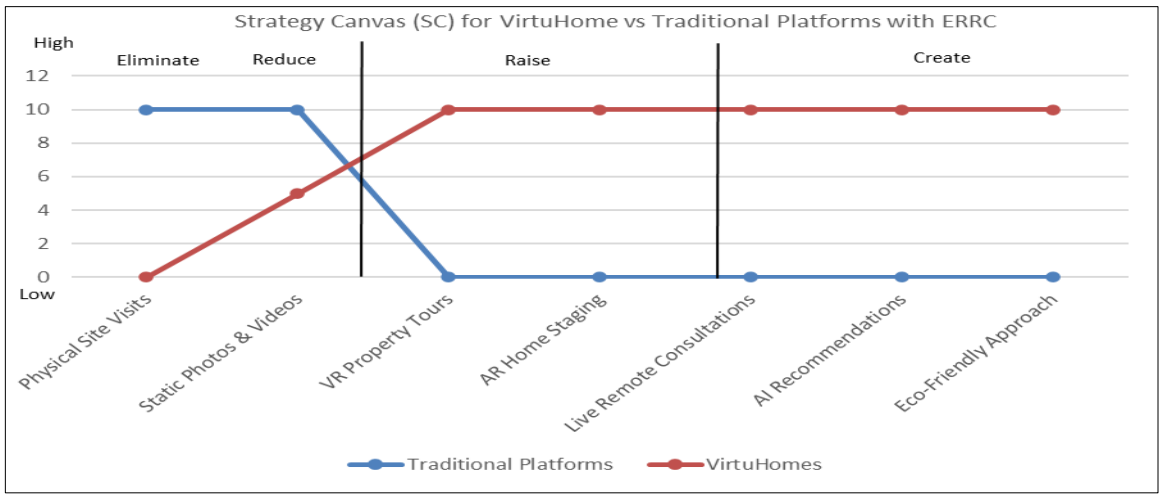


Fig. 18. The strategy canvas for VirtuHome against traditional platform

The Strategy Canvas helps us to visualise how VirtuHome's stands out against other traditional property platforms such as PropertyGuru , iProperty, EdgeProp and. It highlights the basic offerings that are usually expected by the customers,

and the key differentiators, or in another term, purple cow, that will make VirtuHome special and valuable to its customer segments.

The Purple Cow statement was originally introduced by Seth Godin. The terms mean creating a product or service that is different and unique that will gain attention in the market. In VirtuHome's case, basic expectations such as showing property listings, prices, photos and videos are all fulfilled, which are also similar to what other platforms already provide, but in this case, VirtuHome's offers "Purple Cow", or in other words, features that makes us stand out, which are:

a. **Immersive Virtual Reality (VR) Property Tours**: Allow users to "walk through" properties digitally.
b. **Augmented Reality (AR) Home Staging**: Let users place virtual furniture to visualize the space.
c. **Live Remote Consultations**: Users can meet agents online without needing to travel physically.
d. **AI Personalized Property Suggestions**: Smart recommendation system based on user preferences.
e. **Eco-Friendly Approach**: Reducing carbon footprint by minimizing unnecessary site visits.

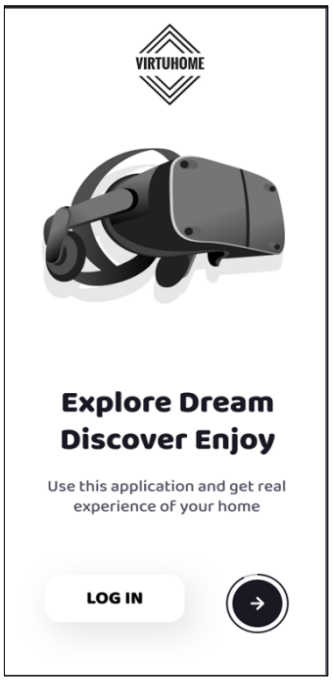
7.4. High Fidelity Wireframe/Mock-up/Prototype digital platform/app

The high-fidelity prototype of VirtuHome is divided into two main user perspectives: Customer View and Agent View. Each interface is designed with its specific user journey and functionality in mind, ensuring a smooth and intuitive experience for both parties.

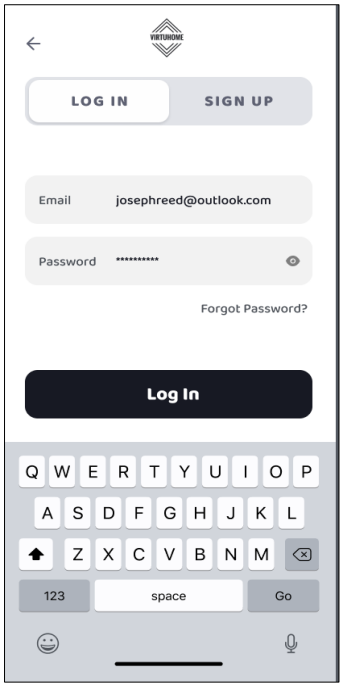
7.4.1. Buyers and Investors UI

The customer interface allows users to register, search, and explore properties through an immersive experience using VR and AR technologies. From signing up to chatting with agents and booking VR appointments, users can browse and view properties without needing to visit them physically. The design focuses on accessibility, ease of navigation, and visual engagement.

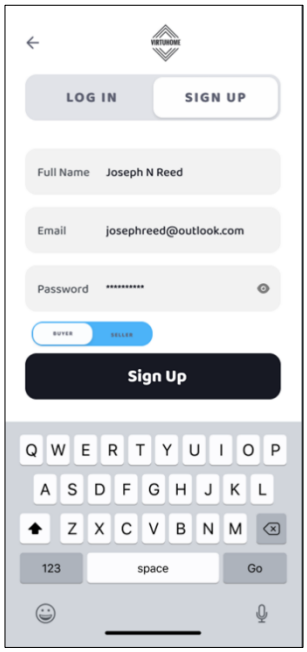
a. Splash



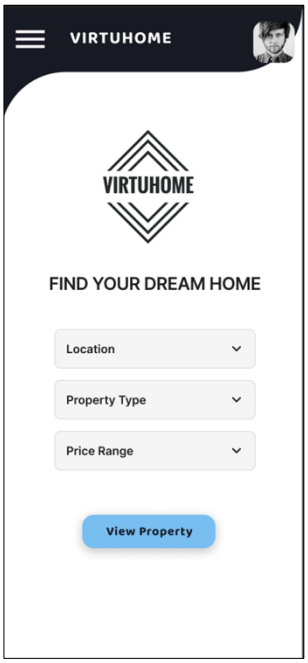
b. Main Page



c. Log-In Page

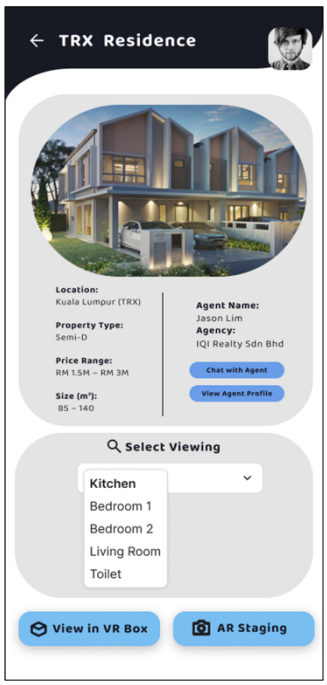


d. Sign-up Page

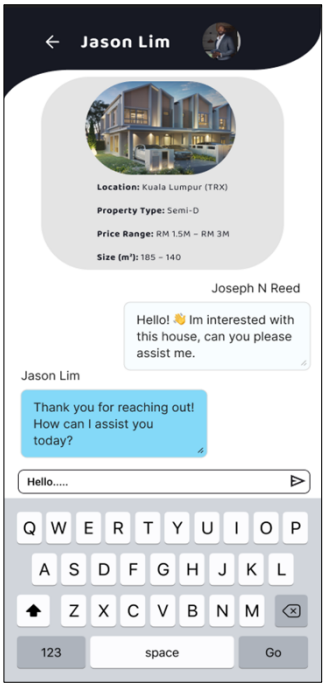


e. Search Page

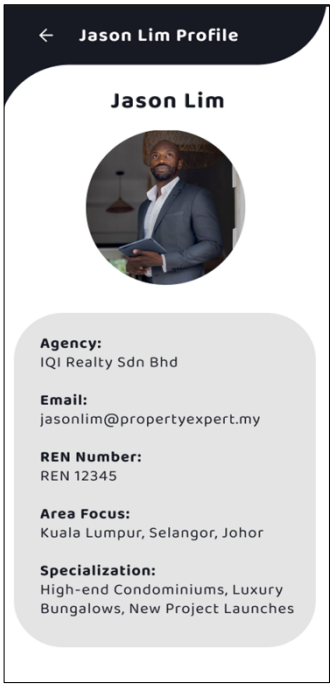
f. Home Page



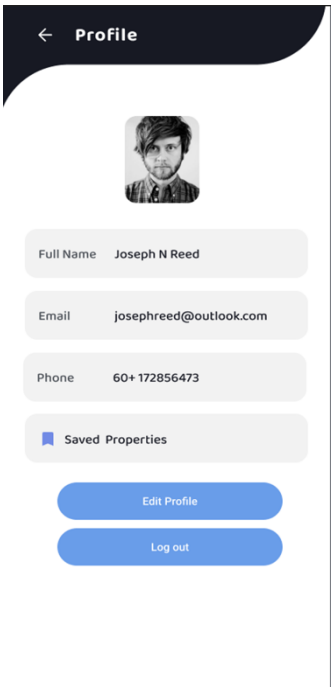
g. View Property Page



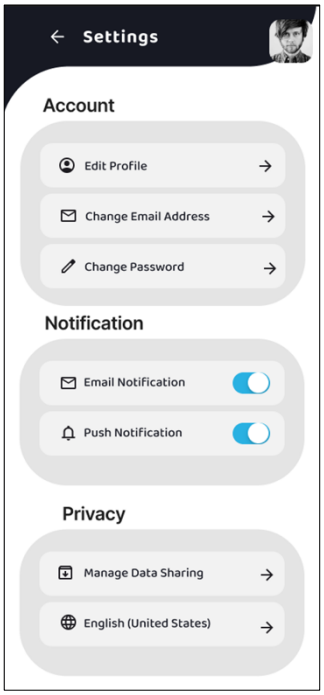
h. Chat with Agent Page



i. Agent Profile

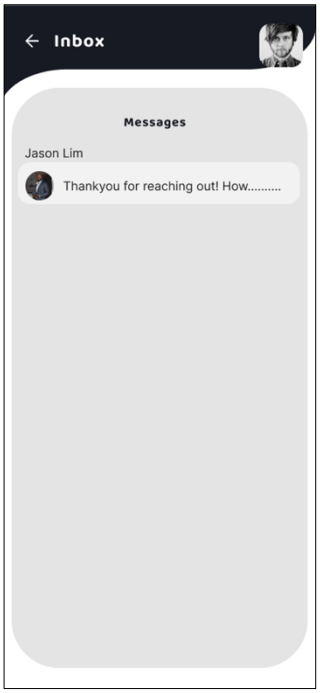


j. Profile Page

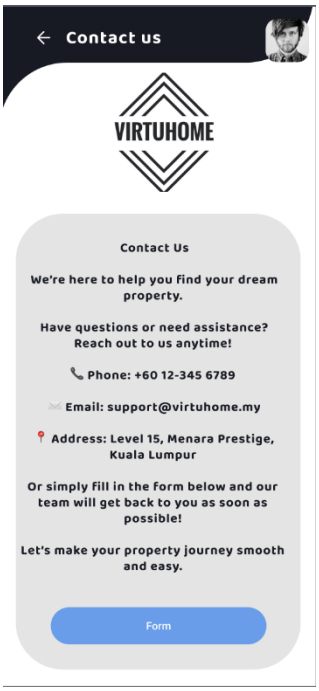


k. Settings Page

l. Saved Page



m. Inbox Page



n. Contact Page

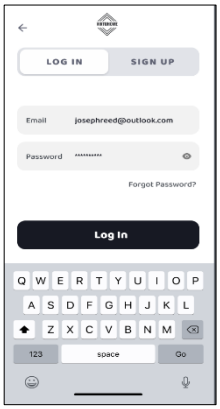
i. Form Page

7.4.2. Property Agent UI

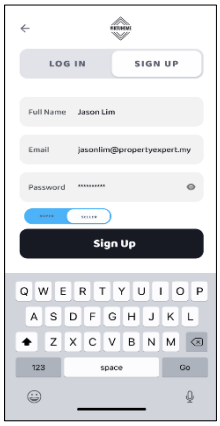
The agent interface is tailored for real estate professionals to manage property listings, respond to customer inquiries, and schedule VR sessions at nearby branches. Agents can upload properties, maintain their profile, and provide real-time support during virtual tours. The layout emphasizes efficiency, communication, and support throughout the customer journey.

a. Splash

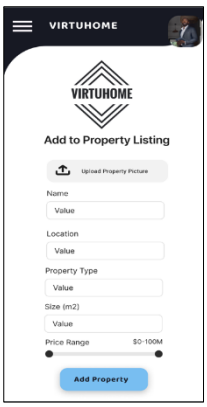
b. Main Page



c. Log-In Page



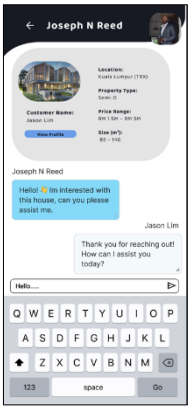
d. Sign-up Page



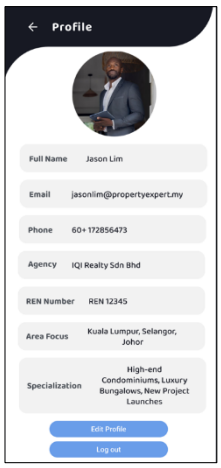
e. Add Property Page

f. Home Page

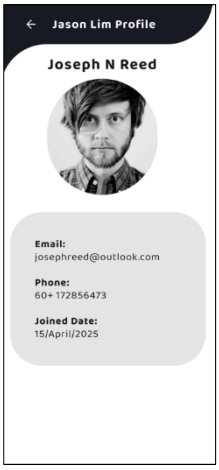
g. Edit Property Page



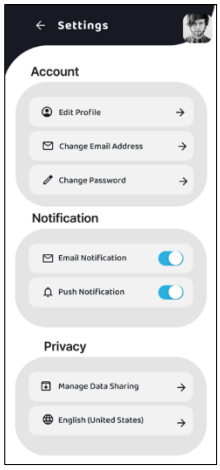
h. Customer Chat



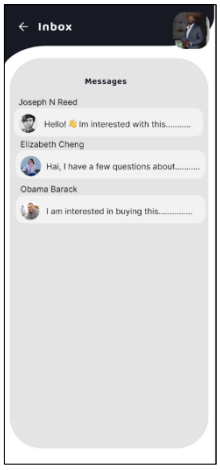
i. Agent Profile Page



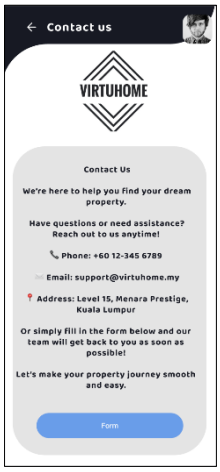
j. Customer Profile Page``



k. Settings Page



l. Inbox Page



m. Contact Page

n. Form Page

8. CONCLUSION AND FUTURE WORK

The development of VirtuHome's business model highlights several key achievements and addresses important challenges faced by the customer segments. Buyers and renters often experience frustration due to time-consuming site visits, difficulty visualizing spaces, and lack of real-time support. Developers and agencies, meanwhile, face pressure to market their projects in more innovative and efficient ways. Because of that, VirtuHome responds to these needs by integrating immersive technologies like Virtual Reality (VR) and Augmented Reality (AR), enabling remote tours, interactive home staging, and personalized AI suggestions. These value propositions serve as major gain creators, reducing the burden of physical visits and providing accurate, data-driven property experiences. The Business Model Canvas effectively aligns each element of customer segments, channels, revenue streams, partnerships, and cost structures towards solving these core pain points and creating a more engaging digital real estate journey.

Looking ahead, VirtuHome aims to further refine and elaborate on our validated conceptual business model into a comprehensive business plan. This includes expanding on market entry strategies, forming more diverse partnerships, and integrating advanced analytics such as behavioral insights and predictive pricing models. Additionally, future development will focus on incorporating sustainability metrics and legal compliance features to appeal to environmentally conscious users and ensure regulatory readiness. With rapid technological advancements and changing consumer behaviors, VirtuHome will continue evolving its platform by leveraging innovations in AI, Big Data Analytics (BDA), and Internet of Things (IoT) to enhance user experience, operational efficiency, and long-term scalability.

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