



Digital Marketing in Luxury Real Estate

How 3D virtual tour and agent presented video tour are impacting the marketing in real estate?

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Abstract

Digital marketing is a powerful influencer that has grown considerably across sectors especially in the real estate business. This research sought to analyze from a buyer's perspective how 3D virtual tours and agent-presented video tours affect the marketing of luxury properties. Its implementation adopted a quantitative approach using online survey methods sent to persons familiar with and with knowledge of the digital tools employed in marketing real estate.

Results indicated that 3D virtual tours are viewed as being more useful for decision-making in understanding the layout of properties and agent-presented video tours were more interesting and engaging. Most respondents indicated they were highly inclined to use both tools on an ad hoc basis with a mild preference for 3D virtual tours, given their immersive experience attributes. Additionally, both digital tools significantly reduced the need for several in-person visits to facilitate remote buying.

From the results, the study recommends that future research examines the impact of other new technologies such as augmented reality on real estate marketing and to study even broader population for further validation of the obtained results.

Keywords/tags (subjects)

Marketing, real estate, digital

Miscellaneous (Confidential information)

For example, the confidentiality marking of the thesis appendix, see Project Reporting Instructions, section 4.1.2

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1 Introduction

1.1 Background, motivation, and purpose

The second half of the 20th century saw a revolution in technology that would completely change the way human beings interact, share information, and conduct business. Fore fronting this revolution was the invention of the internet, a tool that allowed people across the globe to access and share plenty of information in an instant. As the internet gained more visibility, business houses soon caught on to its potential as a medium to reach new markets and consumers. In 1994, Wired carried the first-ever online ad, giving rise to what we have come to understand as digital marketing (Singel, 2010). The new communication medium would prove to be a game-changer for business houses seeking to promote their offerings to a global market.

As online marketing gained momentum, the real estate industry, which was historically famous for its marketing techniques, was one of the first to embrace the online revolution. Real estate companies soon understood that the internet was a rich resource that could go far beyond local markets. Selling and buying properties online revolutionized the way real estate was transacted. No longer would buyers need to visit physically dozens of agencies or rely on paper brochures to discover what was on the market. In one click, buyers could glance over a fantastic selection of listings, photos, and detailed descriptions from agencies around the globe. The internet permitted the simplification of the house-buying process and enabled buyers to view property at their leisure.

Buyers use of Internet in Home Search Process, 1995-2017

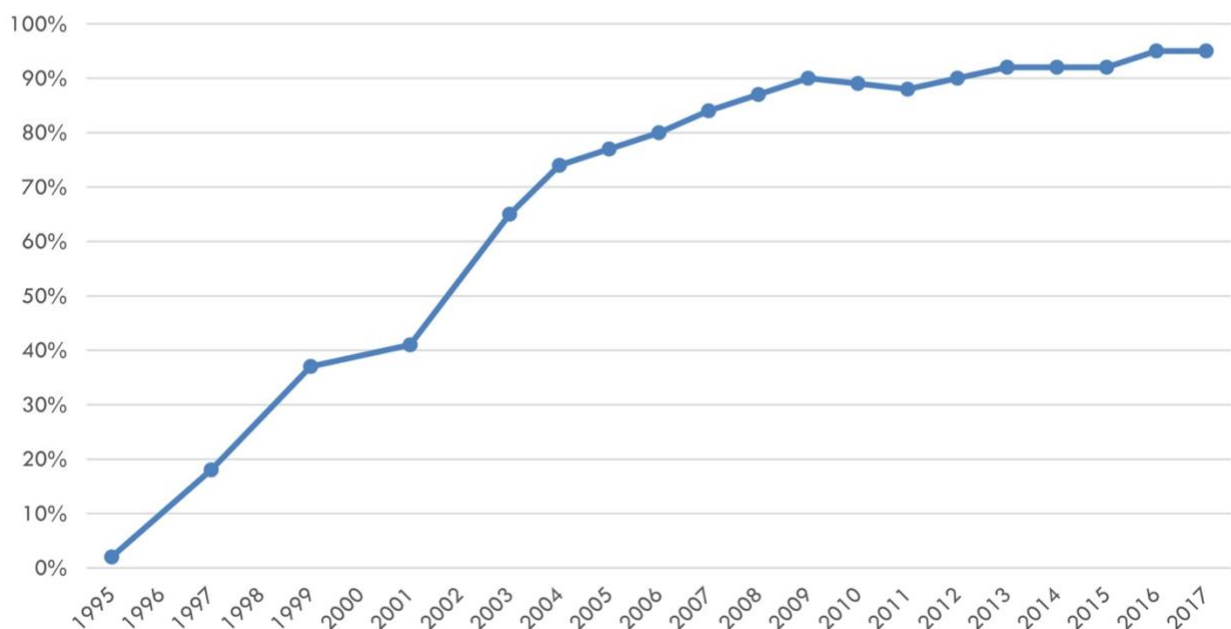
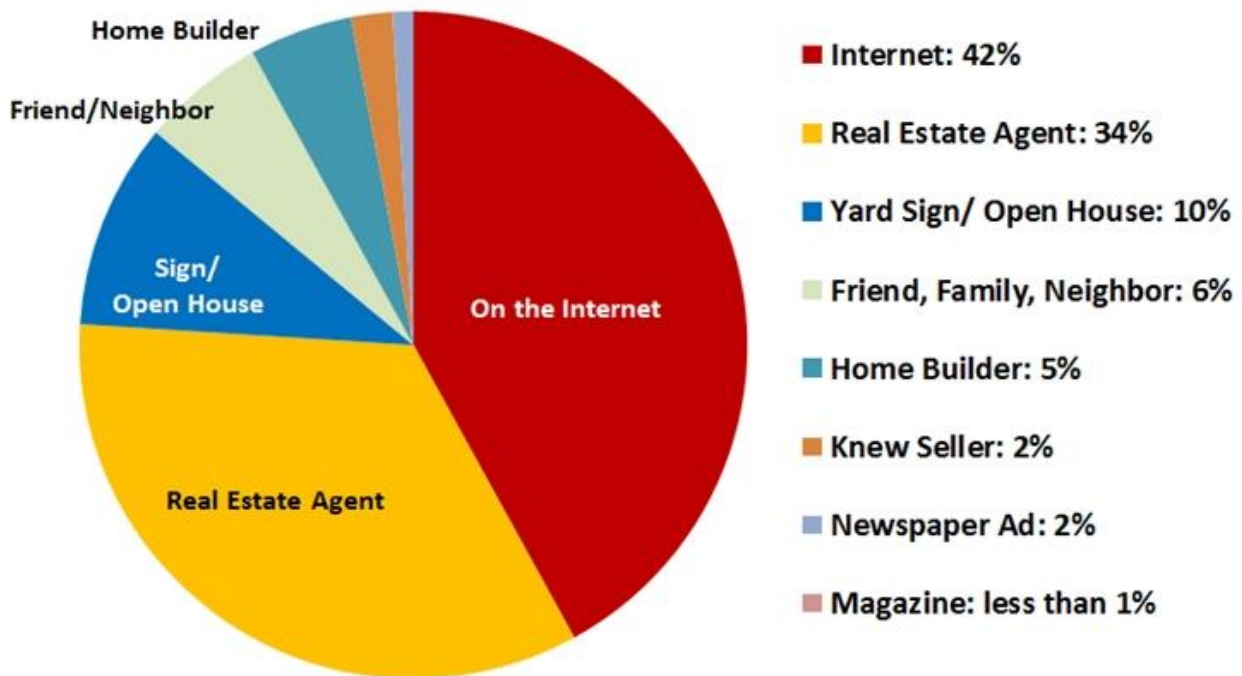


Figure 1 Buyers use of internet

By 2017, it was estimated that 95% of home buyers were using the internet to search for properties, illustrating just how integral the digital realm had become to the real estate market.

Where Buyers Found the Home They Purchased



© Paragon Real Estate Group

Per the 2012 NAR Profile of Home Buyers & Sellers

Figure 2 Buyers tools

42% of buyers located properties online, higher than the 35% of buyers who used conventional methods, agents, reports Paragon (2012). The percentage exactly reflects growing use of electronic media and internet tools in the real estate industry. In a span of a few years, real estate marketing had seen a sea change with digitalization, where the internet had been at the core of the buying of houses. Such growth in digital media in real estate had touched its zenith during the COVID-19 pandemic.

With lockdown and social distancing, property viewing was no longer possible. Real estate agents quickly developed and implemented advanced digital technologies facilitating remote property viewing as a solution to this. Agent-presented videos, video conferencing, and 3D virtual tours were key contributors to allowing buyers to view properties from the comfort of their own homes. Not only did the technologies maintain the active level of the real estate business at a period when the industry was in the middle of a crisis, but also highlighted how online advertising's popularity is still on the rise and influencing the way real estate is marketed and purchased. The pandemic also hastened the adoption of these tools, which further demonstrated that digital marketing is not just a stopgap measure but also a future opportunity to reshape the selling of real estate going forward. The application of digital marketing tools in real estate has also had profound implications for buyers and sellers.

The integration of real estate with digital marketing technologies has had profound implications for both sellers and buyers. For the buyer, being able to access property information online and virtually walk through homes using video walkthroughs and 3D walkthroughs has made the search process much more

convenient, efficient, and interactive. Virtual tools have allowed potential purchasers to have a detailed knowledge of a property without even viewing it, which has proved to be extremely useful for overseas buyers or those who have limited time. For estate agents, the tools have created new possibilities of interaction with clients, presenting properties in interesting and interactive manners, and establishing more personal rapport with prospective buyers.

The author was drawn to the real estate field by a family and personal connection. The author's father began working in the sale of paintings and antiques prior to moving into the real estate field later in life. He later established his own real estate business in Biarritz, a high-profile and upmarket location in southwest France. Through watching his father transition from fine art to real estate, the author developed a deep appreciation of the subtleties and the mechanics of the luxury property trade. This exposure gave insight into the issues and challenges that real estate agents experience in the sale of property, particularly in luxury markets where clients' requirements are atypical and always motivated by prestige and exclusivity.

Having had such a background, the author was also interested in learning about how internet marketing had been evolving in the real estate sector. Emerging technologies such as 3D virtual tours and video presented by the agent had prompted the author to learn about how the technologies were impacting the way that real estate agents market properties and affect buy-er choice. The theoretical study of marketing and business studies and the practical experience of the property market have merged to fuel an investigation into the role played by digital marketing tools in the situation. The thesis will cover how videos and 3D virtual tours provided by agents are changing the business of real estate, in particular the luxury market, and in what ways these technologies are beneficial to buyers of property and real estate agents.

The primary focus of this research is to investigate the influence of such internet marketing tools on the decision-making of homebuyers and how real estate agents modify the tools to use them effectively. The thesis will cover how such tools influence the attitudes of buyers, their engagement with the properties, and how they influence the entire sales process.

Essentially, the research aims at analyzing how online marketing is revolutionizing the real estate sector, especially the luxury homes business, and how these sorts of technologies impact the reshaping of the consumer experience and sale of property. By gaining such learning, the research aims at creating knowledge that will allow real estate agents to maximize the use of online technology in order to frame the future of real estate marketing. By doing so, the thesis aims to untangle the vast potential that digital technologies hold in influencing the future of real estate and how they can help empower agents and clients to deal with the ever digitized and globalized world.

1.2 Research objectives, questions, and approach.

RQ1: What is the impact of 3D virtual tours and agent-presented video tours on the luxury real estate market from the buyers' perspective ?

RO1: To find out what is the impact of 3D virtual tours and agent-presented video tours on the luxury real estate market from the buyers' perspective based on a survey in form of quantitative questionnaire.

1.3 Thesis structure

This thesis is composed of six chapters. The first chapter is the introduction and will introduce the background, motivation, purpose, research objectives, questions, and approach of the author. The second chapter will present the main concepts and theories developed in previous work that will help us build the framework of this research. The third chapter will reveal the research design. Then the fourth chapter we will present the data collected during surveys. After that, in the fifth chapter we answer the initial question with evidence collected during chapter four. Last but not least, in the last chapter we discuss the limitations of this study and discuss the next research to deepen the subject.

2 Literature review.

2.1 Residential Real Estate.

Residential real estate entails properties that are categorized under various forms, such as single-family homes, apartments, condominiums, and sub-residential makes. This is known to hold a lot of opportunity as a stable investment vehicle through which income through rent may come and over time capital appreciation. The below sections would discuss further in details many attributes, investment potentials, and market dynamics.

Characteristics of Residential Real Estate.

Types of Properties: Characteristics include a family property, multi-family units, and condominiums, each representing different demographic demands.

Stability of Investment: Residential real estate is likened to long bonds because it yields regular and periodic rents against less risk and investment (Wójcik, 2016).

Investment Potential.

Income Generation: Different properties will offer tenants reliable sources of income from rents, thus very attractive for investors (Diyarova, 2024).

Market Value Factors: The price of residential properties has physical, social, economic, and legal determinants, internal or external to the property (Uhruska, 2008).

Legal and Social implications.

Home Protection Laws: Many legal establishments hold that residential real estate enjoys special legal privilege as it touches the individual identity and the community of which that access is one of the most recognized within its acknowledged importance (Stern, 2009).

But while this makes residential real estate appear to be a very safe investment - it can bring out market skewness- such as inflated housing prices and unfair financial burdens between different homeowner demographics-making one wonder about the net effect on society (Stern, 2009).

2.2 Digital marketing.

Digital marketing in residential real estate includes several strategies and tools that use digital channels to promote properties and engage potential buyers. This was brought about by fast-changing technology and

consumer behavior. Key elements of digital marketing in this field include search engine optimization (SEO), social media marketing, and various forms of targeted online advertising, coupled to promote visibility and accessibility of real estate listings.

Key Elements of Digital Marketing of Residential Real Estate.

Search Engine Advertising: Using platforms such as Google AdWords to target very specific demographic audiences and to increase the visibility of properties; this thus becomes imperative in a competitive marketplace (Basmaci & Çengel, 2018).

Internet Utilization: The transformation from traditional to online advertisement has been extensive, while consumers now massively search the internet for property due to changing preferences (McDonagh, 2007).

Advantages of digital marketing include wider outreach and lower costs; however, it can also be regarded as a challenge because it requires constant updating due to the rapid changes in technology and consumer expectations. Because of this, the real estate sector must be in constant change so that it can take advantage of the benefits provided by digital marketing.

2.3 3D Virtual Tours in Real Estate Marketing.

3D Virtual Tours represent an offbeat yet innovative approach to relying on virtual reality technology to enhance the showcasing of properties within real estate marketing. These immersive experiences will allow prospective buyers to view properties virtually and provide an experiential view that integrates with the conventional approach. This article will cover the following aspects with regard to 3D virtual tours.

Definition and Functionality.

3D virtual tours make use of 360° equirectangular images in order to offer a sense of immersive experience by which he is able to walk through spaces in property similar to reality. These virtual walkthroughs enable the users to walk around through the spaces in property just like a real time user would do (Chhikara et al., 2023).

Such technology provides variety and interactivity, whereby the viewer gets to see angles and features of property as they choose them, and the perception is quite phenomenal in terms of engagement and decision making (Hussin et al., 2023).

Benefits in Real Estate Marketing.

Virtual tours save time and costs for both parties, as they reduce visits when it comes to buyers and sellers thus making the sales process more efficient (Anto et al., 2023).

It makes more accurate visual representations of properties and most of the common problems with traditional 2D images that mislead potential prospects are solved by this (Hussin et al., 2023).

Technological Advancements.

The new advent is the automated systems for generating the virtual tours, which minimize the time and effort needed for manual image linking (Chhikara et al., 2023).

Augmented reality features within the mold allow the clients to visualize along with the customization of properties further, enhancing the overall marketing strategy (Solanki et al., 2023). Although 3-D virtual tours have great advantages as far as real estate marketing is concerned, yet there are a number of

challenges such as being in a rather complex setup of technology and requiring huge investment for training and infrastructure (Hussin et al., 2023).

2.4 Agent Presented video tours.

Agent-presented video tours in real-estate situations refer to interactive virtual experiences whereby digital agents guide potential buyers through this tour of the property in an enhanced viewing experience. In this instance, the technology working with the application include one or more of: virtual reality (VR); automated presentation system, etc., with the focus on creating immersive environments and experiences for the potential buyers who can now explore the properties without having to be physically present in the property. Henceforth, the subsequent sections will elaborate on all key aspects of this innovative approach.

User Engagement.

Interactive Agents: The digital agents need to vary according to the user's preference, personalizing their responses to individual gaze and attention patterns (Hoekstra et al., 2007).

Enhanced Marketing: The agent-presented tours counteract any disadvantages by contributing positively as an effective marketing tool, drawing potential buyers into getting a very vivid image of the property, hence, opening the channels for increased sales opportunities (Hussin et al., 2023).

While agent-presented video tours are obviously a plus when ease and engagement are concerned, some potential buyers still prefer the traditional route because they simply choose to stick to the familiar or to have the hands-on feel of physically walking through a property. This shows the immediate need for a balancing act in approaches toward marketing in the real estate field.

2.5 Decision making process.

The decision-making processes in real estate are the interplay of several variables, including market conditions, investor motives, and risk-management strategies. The qualitative and quantitative data shall change considerably from one market to another and from one investor type to another. These dynamics are important aspects of investment strategy because they essentially discuss: investors' motives and market factors.

The investor is mostly mesmerized by the beauty of the real estate product, which are variable- market conditions, economic stability, and potential returns, according to (Balsic & Gustavsson, 2013).

Some market factors, like sustainability and technological advancement, have grown significantly more important since the financial crisis (Balsic & Gustavsson, 2013).

Information quality and decision-making.

The quality and completeness of the available data influence the decision-making process within real estate. Incomplete information may lead to suboptimal decisions, whereby a simpler process would have been required to manage uncertainty (Renigier-Bitozor et al., 2016).

Expert investors tend to utilize a broader range of data cues compared to novices, which indicates that experience plays a critical role in effective decision-making (Sah, 2011).

Risk Management.

Inherent risks come with real estate investments, and for any successful decision-making, its risks must be mitigated at the very beginning of decision-making. Thus, this includes timely problem-solving and an accountable decision-making process (Gehner, 2008).

Techniques such as the TOPSIS method can be used to evaluate multiple investment options, hence improving the decision-making process through structured analysis (Özyeşil, 2019).

Even if complex and uncertain, it is important to mention that for some investors, the decision-making process in real estate may pose different challenges altogether. For example, novice investors might be more influenced by general trends in the market, while experienced investors will be looking at the details of the financial analysis and risk assessment.

2.6 Remote buying behavior.

Remote purchase behaviors are described as process purchase behaviors, where potential homebuyers engage in buying properties, apart from the property location. Such purchase behaviors are powered by modern technology, enabling the buyers to consult property information, visit listings, and even complete transactions online. The transition towards distance purchase is due to an increasing number of online real estate platforms and reduced functions of traditional real estate agents in accessing information. This transition has great reforms on the real estate industry as a key part of the changes toward the consumers making independent considerations in the decision-making process.

Technological facilitation Remote buying has systems by which the customers can establish personal accounts, choose favorite properties, and even control their preferences online. So, customers could search and print out related property files effortlessly, so it is making the property transaction process more efficient (Wang, H, 2005).

Because consumers can now directly get vital details about properties through the internet, the availability of public information online has reduced their dependency on real estate agents (Chiu, 2016).

Changing Consumer Behavior.

Most real estate interests nowadays start online as consumers have taken a self-service attitude towards home buying. This phenomenon has brought about a lesser value proposition to real estate agents as the essence of their service is increasingly replaced by technologically driven solutions (Chiu, 2016).

Companies are advertising that they would disrupt the markets by creating technology-based solutions that enable consumers to sell and buy homes on their own. However, such attempts have largely not been successful because of the unmet needs of other stakeholders (Chiu, 2016).

Implications for the Industry.

The paradigm shift towards remote buying will challenge the traditional commission-based model of real estate agencies, thus forcing a rethinking of their role and the value they add to the transaction (Chiu, 2016).

The industry will experience another value redistribute through the redefining of the rule where the technology empowers consumers and potentially reduces transaction costs (Chiu, 2016).

Although remote buying behavior is catching on, it needs to address some limitations and challenges it brings. For example, without a physical presence, reliance on virtual tours and other digital representations may not really capture the subtleties of the property. The feel of a neighborhood, among other emotional and experiential aspects of home buying, cannot be translated digitally. These indicate that technology even though makes remote buying easier-is not likely to replace the entire in-person experience.

2.7 Perceived value.

Perceived value is the value a customer assigns to a product or service in excess of its actual cost or market value based on the customer's perception of its usefulness, desirability, and features. In the real estate sector, there are a number of factors that influence a buyer's perceived value of a property: location, condition of the property, size, amenities, and marketing aids to portray the property such as virtual tours, video presentations, and professional photography.

The following factors contribute to creating perceived value in real estate:

Property Presentation – Quality photographs, 3D virtual tours, and agent-presented video tours enhance the perceived value of a property because it casts the property in the best possible light so that the life appears attractive and desirable.

Emotional Appeal – Buyers often value properties based on how a property feels to them. Virtual tools like video tours serve to create an emotional connection that promotes the essence and feel of the space, thus impacting the perceived value by the buyer.

Comparisons – The perceived value is often a comparative assessment made against properties that share some commonalities in the same market. If the property is skillfully presented from a digital marketing point, it just may feel more valuable than its counterparts.

Trust and Transparency – In general, a well-organized, professionally presented property creates an immediate sense of trust. It increases that perceived value when buyers can't physically make a garden visit and all information displayed seems to be honest and accepted, even when aided by the best simulation tour possible.

2.8 Theoretical framework key concepts

2.8.1 Engagement and attention grabbing

These techniques of engagement and attracting attention in the acquisition of residential real estate are important in improving buyer's emotional experiences and facilitating transactions. They are focused on the creation of very immersive, interactive, and eye-catching environments which would pique the interest of potential buyers and keep them focused throughout the purchase process.

Engagement Techniques

Communicative Seclusion: Everyone so engaged becomes committed and has a successful transaction if they are told not to speak with anyone for a period about the engagement (Smith, 2004).

Virtual Reality (VR): The property will really get an impact when a buyer experiences it using VR technology which will be so immersive and interesting that it won't be easy to forget it. It includes personalization and interaction, which improves buyer interest quite significantly (Hussin et al., 2023).

Attention-Grabbing Strategies

Visual Design: These patterns have been shown through eye-tracking studies to significantly impact a buyer's perception of property features. Their importance in driving attention and satisfaction lies especially in those aspects such as size, quality, and layout (De-Juan-Ripoll et al., 2024).

Online Behavior: A study of online search behavior, including fixation duration and total dwelling time on property images, can influence how to present listings based on prioritizing information found most frequently accessed (Seiler et al., 2012).

These engagement and attention-grabbing techniques, though not all buyers may benefit from such high-tech alternatives as virtual reality, would prefer a more traditional scenario of property viewing. The balance between innovation and traditional and old practice will cater to all tastes in terms of preferences.

2.8.2 Usefulness and decision making impact

Perceived usefulness is the sine qua non for decision-making in residential real estate-meaning it affects buyer attitudes and buyer intentions. This notion finds its basis in the Technology Acceptance Model (TAM), where perceived advantages of some applications or platforms can significantly improve engagement by the user and the efficiency of decision-making. The next sections reflect on the usefulness and decision-making tools discussed within this context.

Usefulness in the Real Estate Context.

Definition: Perceived usefulness is defined as the degree the buyer perceives that the use of a particular tool or platform is going to affect a purchasing experience complementarily (Chau, 1996).

Impact on Attitude and Intention: Studies find a strong correlation between the user's perceived usefulness and positive attitude toward the purchasing decision, onward to purchasing intention (Nugraha et al., 2021).

Decision-Making Tools and Their Influence.

Multi-Criteria Decision-Making (MCDM): MCDM-type tools help buyers in evaluating options for properties by letting them assign scores and weights across different criteria so that they can make an informed choice (Branigan et al., 2013).

Behavioral Biases: In spite of the advantages decision-making tools bring, psychological biases may reverse the process initiated by these tools leading the very buyers into a path of less-than-optimal decisions (Branigan et al., 2013).

Digital Transformation and Accessible-Mindedness.

Real Estate Apps: Digital platforms have made property search more efficient through providing thorough information to users and thereby bring in the matter of transparency in transactions (Costa, 2024).

User Experience: Features like property viewing through virtual tours and instantaneous chat with the agent enhance user experience and further its perceived usefulness (Costa, 2024).

Perceived usefulness is a major factor in enhancing decision-making in real estate; however, it must be kept in mind that behavioral biases could prevent rational decision-making. This dichotomy highlights the complexity of purchasing behavior in the residential real estate market.

2.8.3 Buyers preference and experience

Technology is changing buyer preferences and user experience in the process of acquiring residential real estate. Convenience, transparency, and accessibility of digital platforms are influencing buyers in making informed decisions. The following treatment deals with some key aspects related to this transformation.

Accessibility and Convenience

Real estate applications provide access to properties for buyers any time during the day and promote an expedient research process (Costa, 2024).

Virtual tours and high-definition pictures lessen the necessity to visit for an assessment of the property and help to streamline the process of remote evaluation of properties (Costa, 2024).

Data-Informed Decision-Making

By enhancing property valuation on various considerations, data analytics assist the buyer in arriving at decision-making properties (Tang, 2023).

Having knowledge of market conditions and variables concerning a property makes the buyer's life easy in the real estate market (Munasinghe & Munasinghe, 2024).

At the same time, on the downside, digital technologies could make buying untenable by posing challenges like information overload or could totally turn-off buyers with less tech-savviness. Balance will always be a must for a fully-fledged buying experience, weighing innovation versus human touch.

2.8.4 Buying intention

Some psychological and contextual factors influence consumer buying intentions. This means that more so than anything else, buying intention describes a state which precedes actual buying behavior and is formed by the attitudes, perceptions, and outer influences on the self. Buying intention, as a concept, has to be understood by marketers and businesses as it will help enhance consumer engagement and increased sales.

A Buying Intention Theoretical Framework

- **Theory of Planned Behavior (TPB):** The moral and social codes surrounding an individual, in combination with perceptions of behavioral control, act upon the process of buying intention. Attitudes do indeed influence buying intentions, given the findings from studies showing that the aforementioned factors influence an intention to purchase organic foods and real estate (Jiang & Wu, 2022).

Repercussions on Digital Marketing

- **Interactive Marketing:** Intention to purchase via the Internet is affected by interactive marketing strategies. Intention to purchase may be crucial; however, it does not necessarily always translate into a purchase decision. The need for trust and relationship management is thus imperative in digital transactions (Pasharibu et al., 2020).

Contrary to this, some existing studies have pointed towards the influence exerted by external factors, such as economic conditions and market trends, which seem to hold greater powers and effects on buying intentions than their potentially internal psychological counterparts. This exhibits the complexity of consumer behavior across a variety of contexts.

2.9 Research Gaps

The increasing contribution of virtual reality in real estate marketing has been researched. Evaluating the scope through literature reviews, Hussin et al. (2023) expressed that VR improves an immersive and interactive experience in increasing buyers' engagements. However, they identified major setbacks, including low awareness and high perceived complexity among real estate professionals. Their work calls for further studies on the long-term implications of VR on buyer decisions, although it does not study the technology against alternative options such as agent-presented videos, nor does it zero in on luxury properties.

Brenner (2017) conducted a quota sample of 60 individuals and found out VR-staging would increase the chances of visiting a property compared with the use of static pictures. This study has also shown differences when we consider the market and house type of research; thus, less academic research deals with VR staging. The comparison with other forms of digital marketing is missing and also non-existent on engagement with emotions in luxury real estate.

Thus, research will fill those gaps by comparing buyer perception between 3D virtual tours and agents video presentations in a luxury real estate environment with respect to them on engagement, decision making, and the perceived need for physical visits.

In this paper, the following concepts will be used (see chapter 2) as well as the following method (see chapter 3).

2.10 Theoretical Framework .

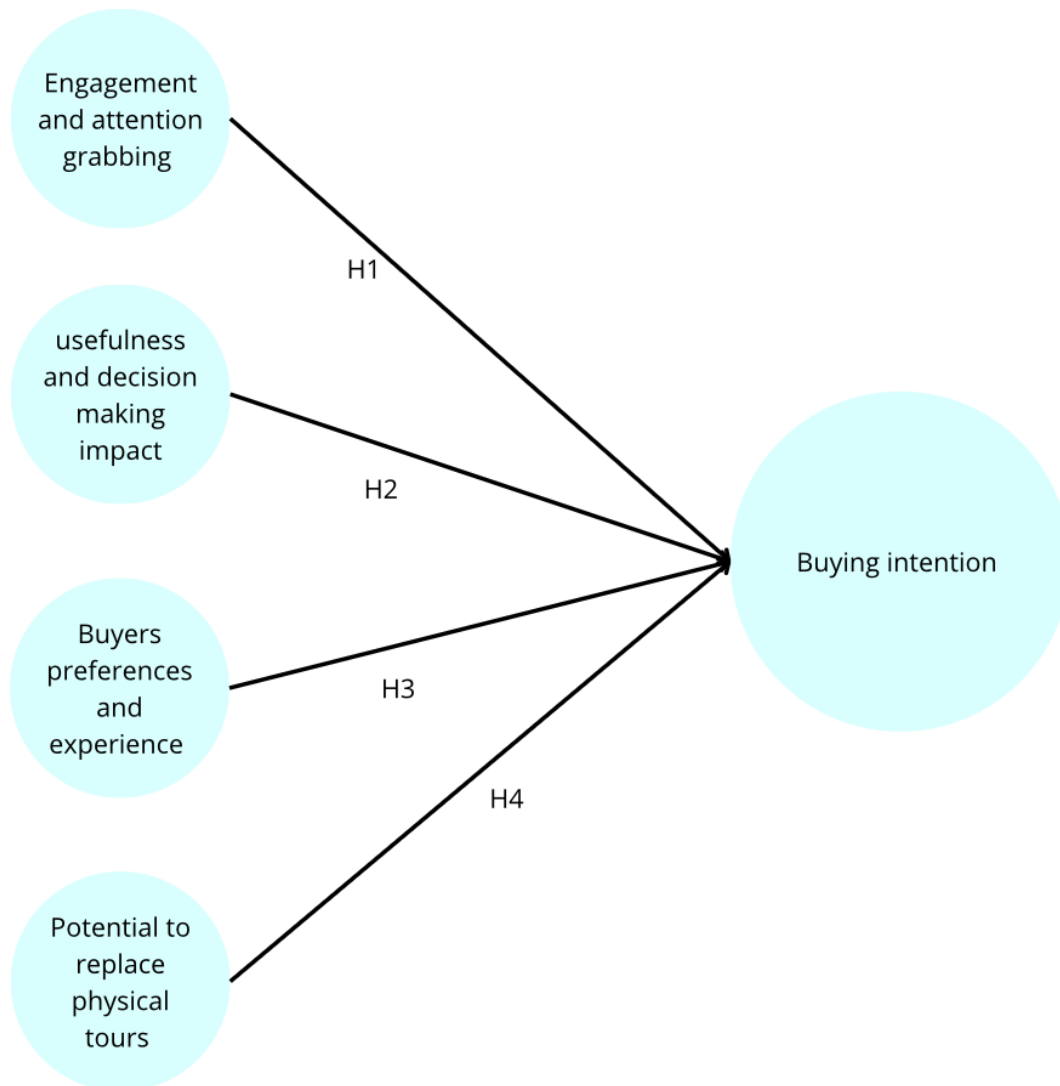


Figure 3 Research Framework

3 Research methods and implementation

3.1 Research context.

This study is conducted in two semesters of research and development courses during the exchange at JAMK University of Applied Sciences in Finland as part of my business studies program. The aim of research is to analyze, the effects of 3D tools and presentation videos on the luxury real estate market. This research falls within the broader context of innovation and digital transformation in the real estate industry especially on how new technologies go into the consumers' engagement and decision-making processes in high-end property purchasing.

Furthermore, this research is part of my bachelor's degree in business. This study will help us know more about the effectiveness of these emerging marketing tools, focusing on virtual tours and digital media, in property sales enhancement.

This research will address the ways that innovative marketing methods will further open the doors to real estate regarding how today's marketing takes the industry into its doors as professionals undergo tech. Adapting their trade to the changing landscape of the luxury property market.

3.2 Research design.

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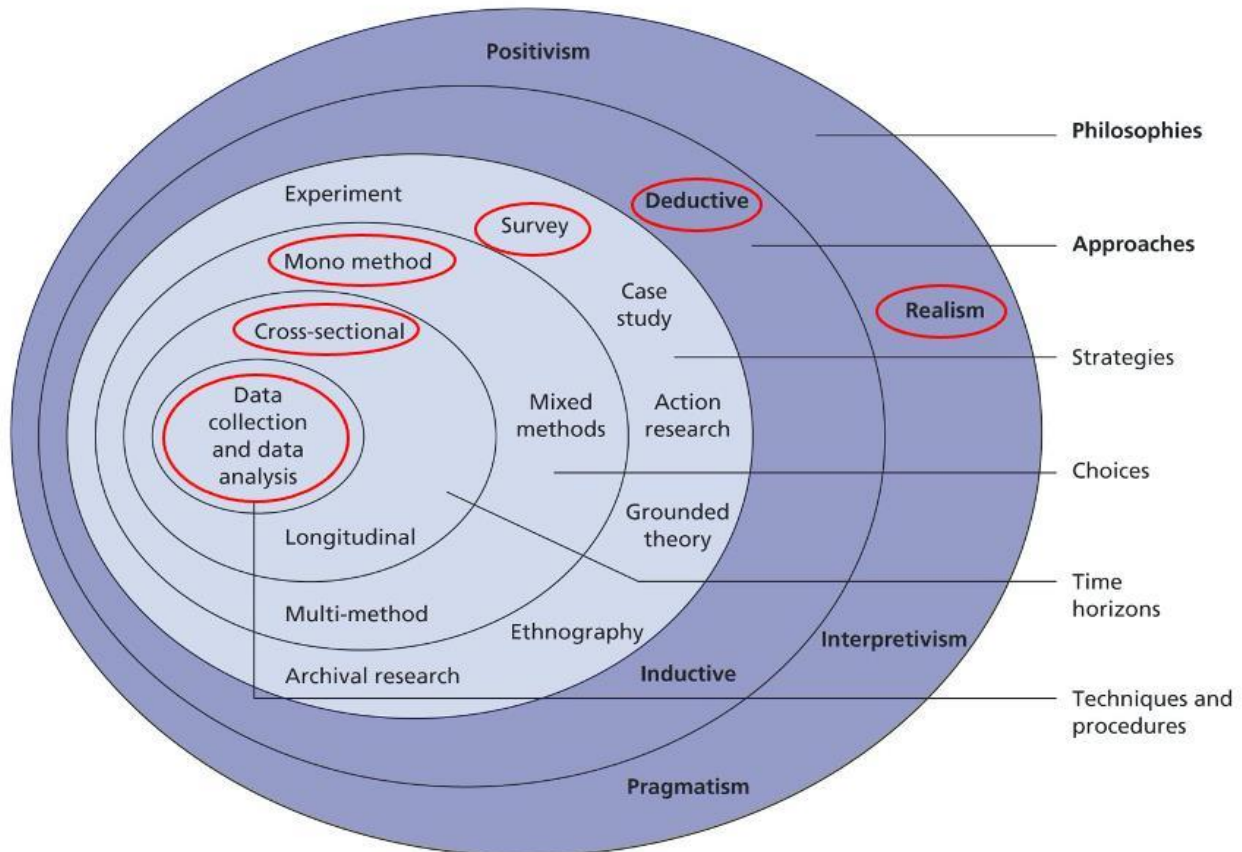


Figure 4 Research Onion (Saunders, Lewis & Thornhill, 2008)

The methods chose for this research design are circled in red on the figure above.

3.2.1 Research philosophy

Realism is the philosophical foundation of many scientific investigations. Realism, as its name implies, asserts that reality is independent of our perception and is graspable and interpretable by the human senses. The philosophical approach shares some common grounds with positivism, wherein both emphasize objectivity and the necessity for evidence of any claim. As a result, realism generally adopts structured, data-oriented inquiry.

The two major types of realism include direct realism and critical realism. Direct realism states that sensory experiences are true and accurate reflections of the external world, whereas critical realism states that what goes on in our field of perception does not necessarily reflect reality; it is simply an interpretative picture of reality prone to distortion by some underlying mechanisms that are often concealed from our view. Thus, the observations we make are worthwhile yet perhaps they only give us a partial view of what is taking place.

The author of this thesis takes a realist approach, more inclined toward critical realism, so that observable behaviors and the deeper, less visible forces that determine them can be studied. This approach matches, therefore, this study's intention of understanding what is occurring in the real estate market and why certain perceptions and preferences arise among buyers.

3.2.2 Research purpose

The specific type of research purpose adopted for this thesis can be categorically termed explanatory. The explanatory design fits in this case because the study seeks to explore and explain the relationships between such digital marketing tools as 3D virtual tours and agent-presented video walkthroughs, on one hand, and buyer behavior in the luxury real estate market, on the other. Instead of simply naming trends or gathering opinions, the research will be geared toward understanding why certain preferences exist and how these tools are actually used in real estate decision-making. The explanatory aim seeks to bag more than just a superficial layer of descriptions: it is aimed at providing insight into the cause-and-effect interplay that permeates the buyers' experiences and expectations when interacting with digital presentations of property.

3.2.3 Research approach

In this thesis, a deducing research approach has been specified. The adaptability of this study is from existing theories and concepts relevant to digital marketing tools and buyer behavior in the real estate sector as the work first posits such arguments. A procedure is constructed, and specific hypotheses are formulated to be tested through the collection and analysis of data based on these stated ideas. Through the deductive approach, an investigation will then take place from the general framework, moving into further focus on the relationship of virtual tools to their perception of usefulness or impact on decision-making. Therefore, it conforms to the goal of also verifying or improving already established knowledge through empirical proof.

3.2.4 Research strategy/method/s

In this thesis, the selected research design is the survey since the great data collection tool for this study. In surveys, quantitative and qualitative information is generated from a wide audience in a systematic way; thus, it can capture standard responses to measure trends, preferences, and attitudes among buyers of luxury properties. Some multiple-choice questions, Likert scale statements, and open-ended responses were utilized in this survey to provide both statistical significance and richer understanding of the scenarios. This allows for congruency with the explanatory and deductive nature of the study: it espouses testing pre-established theories, as well as the exploration of how digital instruments such as 3D virtual tours or agent-led video presentations might influence buying behavior.

3.2.5 Methodological choice

Hence, for this research, a structured, questionnaire-based survey was selected as the method through which quantitative data would be collected. Therefore, this sole method of data gathering was used throughout the study. Thus, the research was both quantitative and exploratory because it intended to sample measurable and comparable insights from participants to enable its analysis and findings.

3.2.6 Time horizon

This study will be conducted on a short amount of time and will fall under the cross-sectional time horizon.

3.3 Data collection

Complete care was taken in the data collection process for this study to ensure that the results of the study were both relevant and complete. The objective of this research is to understand how digital tools in marketing, especially 3D virtual tours and animated agent-presented video tours, affect the luxury real estate market, that is, how they are perceived and how they are used by buyers. In order for the respondents to be accustomed with the tools that were studied, and in order for their answers to actually make sense in result to the research, two primary sampling methods were chosen which are convenience sampling and purposive sampling.

Sampling Methods

The sampling methods were chosen as a result of the need to source responses from individual persons who have the direct experience of using the digital marketing tools employed in the luxury real estate market. Clearly, this is focussed on the perspectives of the target participants who are in the position to provide best insights.

Convenience Sampling: In short, the reason for choosing this way is to make it easy to encounter the participants. As the researcher has direct connection with many others dealing in real estate markets, benefits of convenience sampling could be realized within the relatively limited geographical surrounding, such as south-western France, as this method generally makes it much easier to reach potential subjects quickly. Also, many people's response would be recorded without the time-consuming process that random sampling usually involves.

Purposive Sampling: This method is used to ensure that the selected participants are familiar with the topic being investigated. The intention was that eventual data gathered would come from people who first had exposure to digital types of tools, such as 3D virtual tours and agent-presented video tours.

Such techniques may form a sound basis for comprehensive relevant insights, but they do not cater for the overall sampling of the entire population. For instance, most of these participants came from Southwest France; hence, not every perspective from the rest of France, let alone Europe, is included. However, that the researcher thinks captures the use of this information by narrowing the scope of one market segment brings such understanding and depth into how all these tools are utilized in the luxury real estate market of this locality.

Participants

Buyers: The buyers who participated in the survey are people who actively work in the luxury real estate market. Most of the buyers were from the southwest of France, whose region is marked by luxury properties and a competitive real estate market.

Age: The participants were of various ages, most being 26 to 57 years old. Of the participants, 44.7% belonged to the 26-41 age group, while 30.6% were in the 42-57 age range. There was a smaller percentage of participants either below 26 years or above 57 years.

What is your age group ?

101 réponses

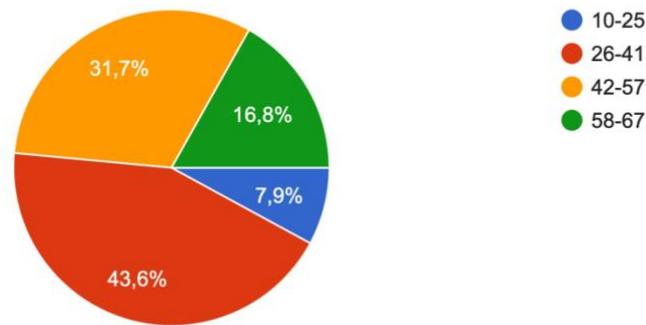


Figure 5 Age groups

Gender: The distribution of the participants was such that 69.4% were male, while the rest were 30.6% female. This trend also corresponds to general demographic trends observed in the luxury real estate market.

What is your gender ?

101 réponses

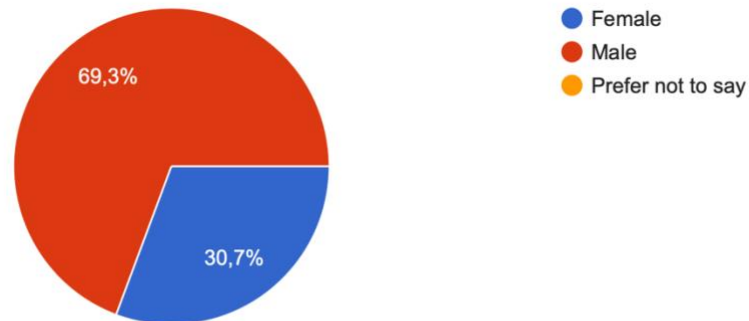


Figure 6 Gender

Nationality: A large proportion of buyers are from France (82.4%). Another 11.8% are from other European countries, and 5.9% come from the rest of the world.

What is your nationality ?

101 réponses

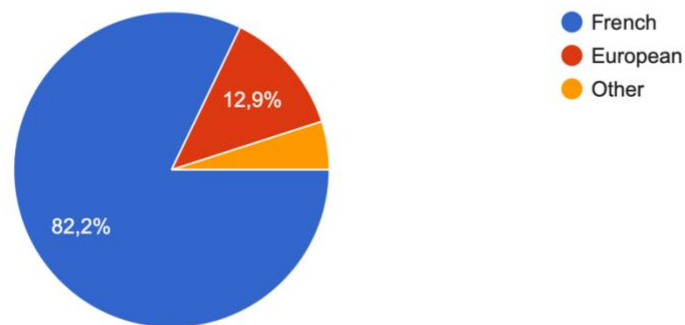


Figure 7 Nationality

Occupation: The occupations of buyers varied; they included 57.6% of entrepreneurs, while 27.1% were employed in various sectors, and these were followed by small contingents in other roles such as homemaking.

What is your occupation

101 réponses

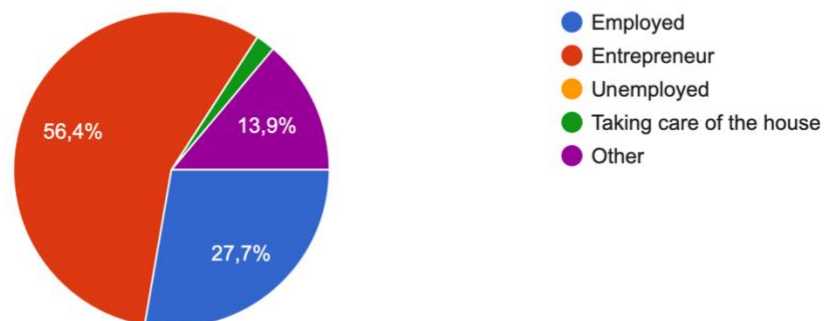


Figure 8 Occupation

Use of Digital Tools in the Past: Almost all participants (97% and 98%) in their property searches had used types of digital tools such as 3D virtual tours and video-based presentations.

Have you ever used 3D virtual reality tour for browsing a property ?

101 réponses

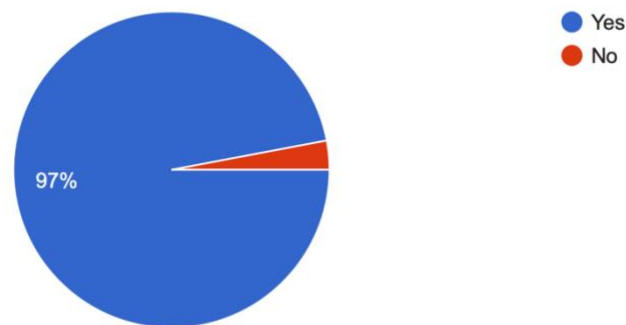


Figure 9 3D for browsing

Have you ever used agent video tour for browsing a property ?

101 réponses

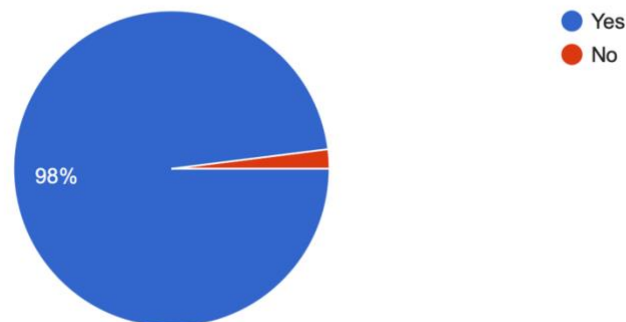


Figure 10 Video for browsing

Purchase History of Property: Of the buyers, 38.8% had bought two properties within 10 years in the past, 29.4% bought three, and a smaller fraction bought four properties or additional ones. These demographically categorized buyers were chosen because they represent luxury real-estate agents' target audiences. By that definition, they are likely to have encountered or used digital tools in their property search, thus making them suitable for this study.

How many times did you buy a property in the last ten years ?

101 réponses

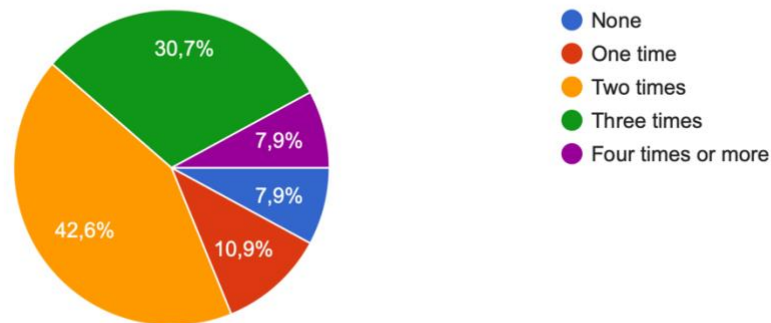


Figure 11 Buying history

Data Collection Methods

For the purposes of this study, data were primarily collected via two methods: buyer surveys and real estate agent interviews. These methods were chosen to elicit the collection of a combination of quantitative and qualitative data resulting in a more comprehensive view of the issue at hand.

Surveys

The survey was a mix of quantitative and qualitative. Likert-type scale questions regarding the feelings of respondents toward digital tools—3D virtual tours and video presentations—were included in the survey. For example, respondents rated their impressions of these tools in relation to searching for homes. Multiple-choice questions were also included to understand the perceived value of these tools as well as whether they can replace physical tours of properties.

At the end of the survey were open-ended questions to enable respondents to express their views in more detail. With these open-ended questions, respondents could relate their experiences in using these tools, identify the tools they favored, and explain their reasons for believing a particular tool was effective or not.

The survey was administered on Google Forms and sent to respondents via email, personal messaging, and discussion forums on luxury real estate.

Challenges in Data Collection

During data gathering, the research faced some challenges. One of the more important challenges was that, whereas a relatively dull time had passed for the real estate market in the south of France over the past year, it was conversely a time when most potential respondents were not actively looking, or at least not that engaged, with regard to real estate transactions.

In order to overcome this barrier, the researcher tried to widen the scope of participating respondents; the survey was sent out to clients of other real estate agencies and was also posted on these forums, thus enriching the number of responses and ensuring that the range of opinions captured in the study was diverse.

3.4 Data analysis

3.4.1 Data Organization and Preparation

The information accumulated for this research is through a survey which will be conducted online in Google Forms, where, once all respondents submit theirs, their responses will automatically be transferred into a Google Sheet for structural organization and analysis. To make sure that the dataset really meets the aims and objectives of this study, it omitted responses given by those who indicate that they have never used the digital tools in question. This way, the integrity and quality of the dataset have been maintained by using only those respondents who are viewed as knowledgeable enough about the digital tools for the analysis results.

3.4.2 Quantitative Data Analysis

Quantitative data garnered in the survey, consisted of Likert scale responses and multiple-choice questions. To analyze the Likert scale responses, frequency distributions would be examined, assuming this data to be ordinal. This made the overall perception of participants on 3D virtual tours and agent-presented video tours assessed on parameters like engagement, usefulness, trustworthiness, and influences of decision-making with respect to real estate.

Every multiple-choice question, therefore, needed to ascertain such frequency and percentage for each of the options available. This gave an overview on the aspects with high tendencies, such as which tool most of the respondents preferred. For example, if there were questions in which each respondent had to choose his tool of choice, the frequency distribution of response proportions for each tool was obtained and compared. In this way, trends could be developed as to overall preference, and an interpretation was developed as to any group of buyers whereby there were preferences that seemed to tip the scale for one tool over the other.

3.4.3 Data Visualization

Specifically, clear charts and graphs were produced to enhance understanding and indicate the interpretation of findings derived from the survey results. Google Forms generates the graphs for the responses automatically so the pictures could best exemplify key points in the data. These tools lent themselves to a clear and palatable presentation of response distributions, thereby facilitating an understanding of the preferences and perceptions of the participants.

A bar chart could compare the various age groups' responses to the question of what tool they found most engaging, while a pie chart could show the percentage of buyers who had prior experience with digital tools for real estate. These visualizations helped summarize the findings clearly and present them intuitively and effectively.

3.4.4 Limitations of Data Analysis

The survey data furnished numerous insights; an essential one among other limitations is that the sample in the survey was quite representative of a particular real estate market and not a large cross-section of buyers from throughout the world. Hence, these findings might not be fully representative of all real estate markets, most especially those which have different consumer behaviors or levels of digital engagement. Most of the respondents seem drawn from a particular demographic group, which is already its familiar domain with regard to digital tools, which means that the dataset does not represent views of buyers that

may be less technologically inclined or coming from geographical regions in which digital tools capture little traction into the real estate world.

Indeed, the study has limited constraints; nevertheless, it crunches worthy insights regarding the attitudes and behaviors of a niche category of buyers. Since a specific group of respondents with associated experience was considered for study, the study discusses in a critical way how digital tools influence decision-making in real estate transactions. In addition, no critical problems could be found in assuring that the respondent correctly understood the survey questions, thus keeping data responsibly strong.

Future research that extends the findings shared with some other more diverse samples of buyers from different regions and market segments could help assess whether the identified trends exist in other markets or vary significantly according to location, demographics, or even preference on the part of the buyer.

3.5 Ethical considerations

Ethical integrity has been upheld throughout the research processes in a manner that safeguards the privacy and rights of participants. Several measures have been put in place to enhance adherence to these ethical standards such as informed consent, confidentiality, voluntary participation, and protection of data.

3.5.1 Informed Consent

Before starting the survey, participants were given a brief introduction comprising the purpose of the study and the utilization of their responses. Participants were made aware that the research intended to study the impact of 3D virtual tours and agent-presented video tours on the luxury real estate market buyer perception. At that point, participants would proceed to the survey, thereby signifying their understanding and acceptance of involvement in the study.

3.5.2 Confidentiality and Anonymity

To protect the privacy of participants, there was no collection of personal information. Respondents' anonymity ensured that responses could not be traced back to any individual. The anonymity of responses would minimize the risk of social desirability bias and engage the participants in freely voicing their opinions and experiences of the digital tools being studied.

3.5.3 Voluntary Participation

The survey was entirely voluntary, and there were no pressures or obligations upon the respondents to fill out the questionnaire. Instead, they also had the liberty to exit the survey at any time. Hence, the way that participatory surveys were conducted guaranteed that free responses would be given, minimizing the possibility of bias or pressure in the answers.

3.5.4 Data Protection

Collected data were placed in the securely stored repository of Google Forms and linked with a Google Sheet for analysis. The only persons who could access the data were the author of this study and the supervising teacher because the data would not ever be accessible by unauthorized individuals. This will keep the aforementioned data from being stored after completion of the research. Upon completion of the study, any survey responses will be permanently deleted for the privacy of participants and protection against any possible misuse of information.

Thus, this ethical consideration still ensured a very high standard of research integrity within the study concerning the rights participants had in obtaining very important knowledge regarding the efficacy of digital tools in the real estate market.

4 Research Results

4.1 Engagement and attention-grabbing

In this segment, we shall analyze how much engaging and immersive are the 3D virtual reality property tours in contrast with agent-presented video tours based on the survey data. The results indicate that, on the whole, agent-presented video tours outperform 3D virtual tours in both categories analyzed.

Engagement

Agent-presented video tours consistently ranked higher than the 3D virtual reality tours regarding engagement levels. A large 55% of respondents rated video tours "engaging," whereas 35% rated them "mostly engaging." Therefore, we may assume that the videos were good at keeping the user engaged, considering the dynamic and interactive nature of the video content, where the agent is seated with the viewer, guiding him or her through the property.

Most respondents describing the 3D tour experience rated it as being "mostly engaging" (72.3%), while 5.9% rated it as "engaging." Although these ratings are respectable, they underperformed relative to that of the video tours, where a much higher percentage rated the experience as the highest level of "engaging."

The two mediums performed well, but video tours provided far more immediate and extended engagement, earning no ratings of "disengaging," and having far fewer ratings in the lower engagement level bars than the 3D virtual windows, which had a small percentage (4%) rating that as "mostly disengaging."

How would you rate the level of Engagement of 3D virtual reality property searching?

101 réponses

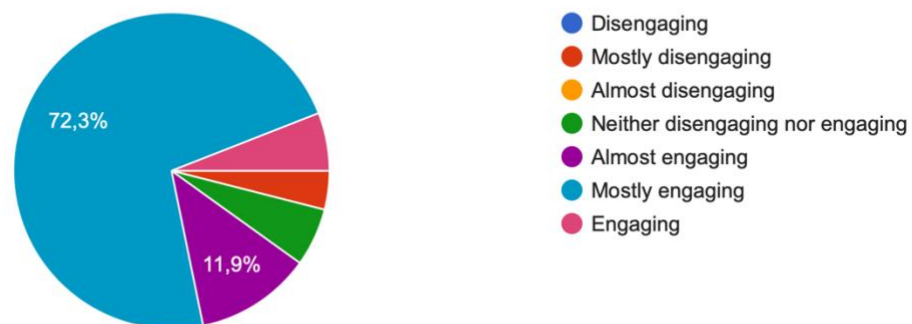


Figure 12 3D Engagement

How would you rate the level of Engagement of Agent presented video tour searching?

100 réponses

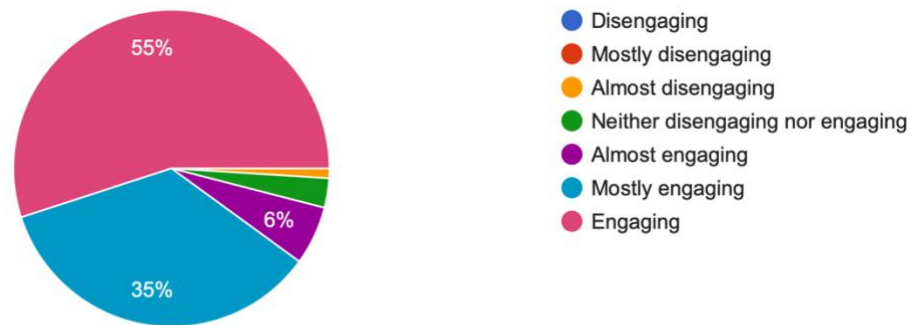


Figure 13 Video engagement

Attention-Grabbing

In respect to the ability to capture attention, agent-presented video tours outperformed 3D virtual reality property tours for the second time.

In agent-presented video tours, a large percentage of respondents rated them as attention-grabbing: the value was 63.4%, while 29.7% labeled the tours as mostly attention-grabbing. These figures suggest that video tours draw the attention of users from the instant they begin fairly well. This is probably due to the human element (the agent) plus the engaging audio and visual nature of the tours.

In contrast, for 3D virtual reality property tours, 12.9% rated them as attention-grabbing, while 55.4% rated them as mostly attention-grabbing. While a great portion of respondents found 3D tours to be attention-grabbing, video tours consistently received higher ratings in this regard.

The feedback suggests that while 3D tours somewhat hold attention, they do not immediately grab attention as agent-supported video tours do. The enhanced attention-grabbing ratings of the video confirm that the moment users take a property tour by video rather than 3D tour, they become interested and maintain engagement with that property.

How would you rate the level of attention-grabbing of 3D virtual reality property in property searching?

101 réponses

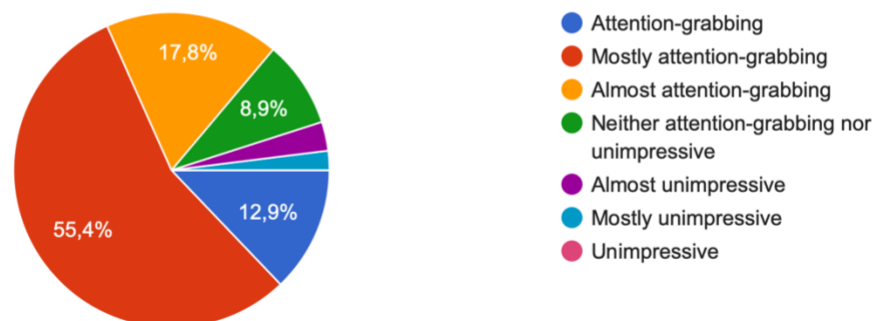


Figure 14 3D attention grabbing

How would you rate the level of attention-grabbing of Agent presented video tour in property searching?

101 réponses

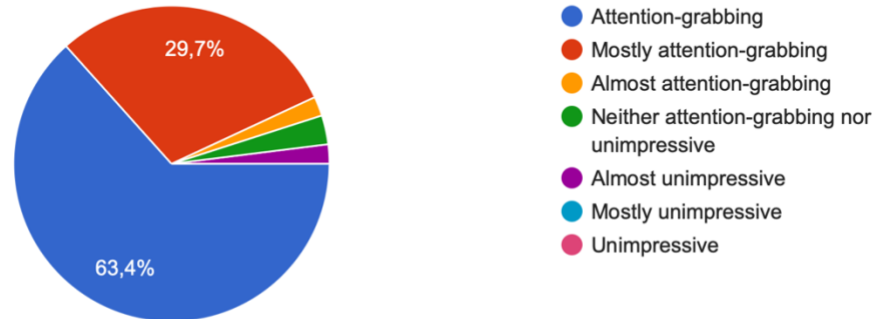


Figure 15 Video attention grabbing

Comparison and Insights

The data describes very well that agent-presented video tours outperform the 3D virtual reality property tours by way of engagement and attention-grabbing skills.

Agent-presented video tours continued to surpass in engagement and attention-grabbing while receiving a higher share of respondents who rated them as «engaging" and «attention-grabbing." In these respects, the dynamic element of the video tour- where the agent interacts with the viewer while giving a tour- would enhance the efficacy of video tours. Video tours keep attention and engagement throughout the property viewing process. 3D virtual reality property tours were lower in engagement and attention-grabbing scores in relation to video tours. Customers appreciate 3D tours for their immersive experience, but data suggests that videos are more effective in grabbing initial and sustained attention during the viewing process.

In summary, agent-presented video tours grab attention above all others and maintain a higher level of engagement during the entire property search process. The 3D tours serve their purpose by allowing for close-up examinations of the property; however, they seem to do so less effectively at grabbing initial attention and possibly do not maintain the same level of engagement as video tours.

4.2 Usefulness & Decision-Making Impact

3D Virtual Reality Property Searching

Survey outcomes clearly show that most respondents have considered the 3D virtual reality property searches very useful. A high 77.2% of participants rated the tool with "useful," implying that the majority buyers agreed with this method as an effective way to explore properties. Another 14.9% respondents graded it as "mostly useful," which even further underpins the argument that this tool is conceived to be efficient for however slight reservations for some, while the only 2% of respondents viewed the tool as "useless," and nobody rated it as "mostly useless." These effects are very strong indications to suggest that most users perceive 3D virtual reality as highly useful for property searches.

Factors that make 3D virtual reality attractive have been found by a survey done on a number of important attributes. Another major indication was that the former feature that amazed had a whopping 94.9%

respondents in appreciating the fact that possible places could be explored from a distance. Today, in fast-moving environments and a digitized era, this feature is of high value as buyers explore multiple properties within the comfort of their homes, especially for long-distance or busy buyers who may not have the chance to visit each property physically.

Alongside remote exploration, 91.8% of respondents appreciated the advanced visualization of properties by 3D virtual tours. They could experience a part of the property in some detail in terms of layout and interior design-the two things that are easily missed through the display seen in the standard photograph. Another important factor noted by 74.2% of respondents was how a property is lifelike and immersive while with the use of 3D virtual reality. Many buyers emphasize the benefit of being "there" in the property, as this helps them visualize living in the space.

Other attractive characteristics include being timesaving (63.9%) and convenient (70.1%). These features give signs that users can use this tool to view properties or homes without scheduling times to attend personally to each potential property showing.

Results of surveys also showed that 3D virtual reality tours had material advantages during the process of decision making. A fantastic 82.7% of respondents felt that VR tours helped them to make better decisions. The immersive aspect of the tool gave users a better idea of how a particular property's layout and space were defined, a very helpful aspect that found consensus about 95.9% among respondents confirming the enhancement of their understanding of a property. This is very good news since 69.4% of respondents have noted a decrease in the number of times they need to visit the property physically after having attended a 3D VR session. This advantage was quite helpful, especially for remote buyers who may not have that much time or capability to visit properties in person.

Thus, these results show that 3D virtual reality tours are considered very useful and beneficial, giving enhanced visualization and increased advantages in convenience and a better overall understanding of a property. The tool is supposed to allow buyers to do evaluations in concert.

How would you rate the level of usefulness of 3D virtual reality property property searching?

101 réponses

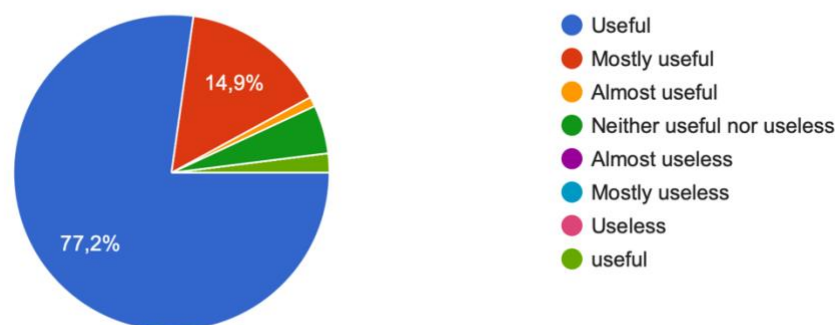


Figure 16 3D Usefulness

What factors do you think make 3D virtual reality property tours appealing for real estate? (Select all that apply)

97 réponses

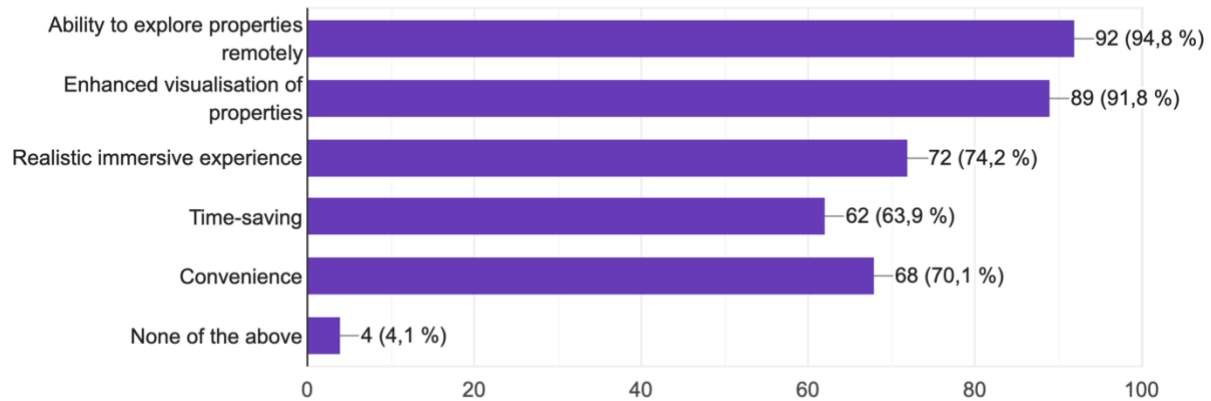


Figure 17 3D factors

Agent-Presented Video Tours

The usefulness of agent-presented video tours did not measure up to that of the 3D virtual reality tours, but it was nonetheless a great advantage to many of the participants. The video tours were rated "useful" by 25.7% of the respondents, while 37.6% rated them "mostly useful." A big 30.7% remarked that the video tours were "almost useful," which indicates that despite their weathered acceptance, they were appreciated, but not as much as their 3D counterparts. Only 2% of respondents rated them as "useless" and not even one person marked them as "mostly useless." This means that these tours were not called life-saving, but their value is definitely not neglectable.

The appeal factors for agent-presented video tours faintly insinuate overlapping qualities with the 3D virtual reality tours, and some significant differences arise. Similar to the case with 3D tours, agent-presented videos offered the possibility of conducting remote property walks, a distinct feature that was appreciated by 94.9% of the respondents. This was, therefore, a commonality in both tools stressing the growing significance of remote property viewing in the current state of real estate markets. Enhanced visualization was again emphasized in 3D VR and recognized as an appealing element of video tours, with 89.8% acknowledging it. On the contrary, viewers viewed the realistic immersive experience as one of the attractive factors of video tours, with only 61.2% reporting it to be a great pull. This difference is likely to mirror the fact that video tours inform but immerse one less than the 3D virtual tours would, with greater interactivity and details.

Another benefit was the time-saving one, even though this was rated less in comparison to the VR3D alternative. The vast majority, 56.1%, saw video tours as a save time, one lower than the 63.9% appreciating this in respect to VR3D. Again, some 62.2% of respondents found video tours to be convenient but not so for its 3D counterpart.

Agent-presented tours were believed to assist the decision-making process, with 76.5% of respondents identifying this as a positive. Also, video tours were seen by 91.8% of respondents as assisting their understanding of the layout and space of the property, a crucial feature in any property search. Still, video tours were not as effective at minimizing physical visits, so a mere 60.2% of the respondents agreed with this benefit. This suggests that video tours, given, do have their conveniences but will, however, remain as

a close second to those buyers who are quite interactive and would never want to pass for anything less in the way of actual visits.

How would you rate the level of usefulness of Agent presented video tour property searching?

101 réponses

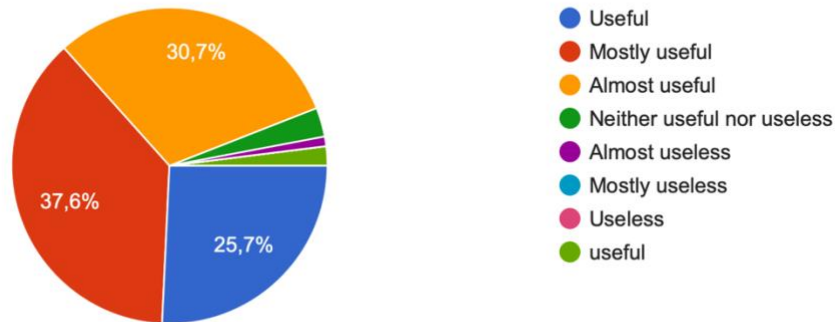


Figure 18 Video usefulness

What factors do you think make Agent presented video tour appealing for real estate? (Select all that apply)

98 réponses

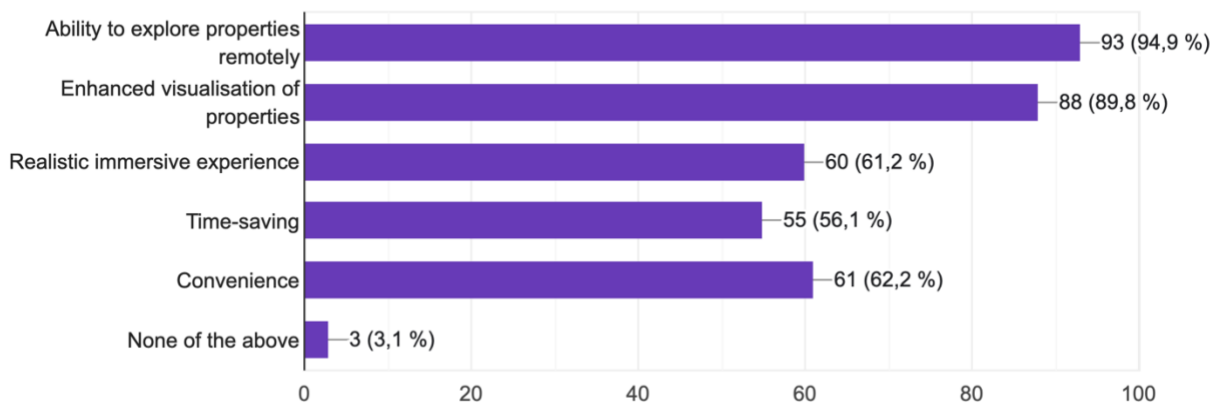


Figure 19 Video factors

Interestingly, 69.4% of respondent's rated agent-presented video tours much more to engage and maintain interest compared to the virtual 49% who felt this way about 3D VR tours. This would indicate that 3D virtual tours are probably considered more useful, but video tours engage and hold the viewer's attention more perhaps because of the dynamic nature of the videos and the presence of an agent guiding the tour.

Comparing 3D Virtual Reality and Agent-Presented Video Tours

It could be remarked that in terms of overall utility, 3D virtual reality tours tend to be ahead in comparison to agent-presented video tours. Most of the respondents viewed 3D VR tours to be rather useful largely due to improved visualization, immersive experience, and the possibility of avoiding actual visits to

properties. These are the boastful strengths of 3D virtual reality making it a preferred choice for potential buyers of high-quality information and remote journeying.

Agent-presented video tours lack most features that make 3D VR appealing to respondents. These include experienced real estate agents taking prospective buyers through houses by giving them an opportunity to view the houses' crucial features remotely, different ways of viewing and screening properties, among others. Unlike 3D tours, however, agent-presented video tours are not transformative as they also do not cut to the time-saving feature, meaning that the interest will decline faster as these presentations do not save precious time. This is mainly because such tours are more passive experiences, placing the users simply in a watching mood. The pre-recorded video does not allow for people to actually engage with the environment like in the 3D VR tours where they are able to navigate and explore the property themselves.

There is still a niche within the market for video touring, particularly among property hunters looking for more engaging experiences. The slightly higher levels of engagement and interest recorded in this regard by the videos seem to indicate that for some users, the presence of the agent in looking at the property is more engaging than one offering a fully immersive experience but less personalized, such as a 3D tour.

In conclusion, while both have their merits, the 3D virtual reality tour clearly emerges as the more useful tool among these. Particularly, in this regard, for users who value optimal visual comprehensiveness, immersive experience, and a reduction in physical visits to property sites, agent-presented videos become an equally valuable substitute for users needing engagement and a much more personal presentation on the property-the latter are not deemed as widely useful as the former. Both tools, however, contribute massively towards modernizing the property search experience and provide different yet complementary benefits to buyers.

4.3 Buyer Preferences & Experience

Tool Preference for Property Searching

Definitely among the best ways of searching for properties, however few would-be respondents, representing an incredible percentage of 73.1%, mentioned that they find 3D virtual tours more interesting than video tours presented by the agent. Their overall disposition toward technology adoption makes it very clear that they understand much better how this recent technology has changed the way buyers perceive property. This really only seems to say that buyers have come to view 3D virtual tours going to be much more immersive, holistic, and futuristic when it comes to remote property exploration. In order to top this, in much the same way, an all-inclusive and connective experience cannot be matched with using video tours and include potential property buyers mentally "walking through" a specific property and really seeing and discovering the configuration that has been planned.

I prefer to use for property searching

93 réponses

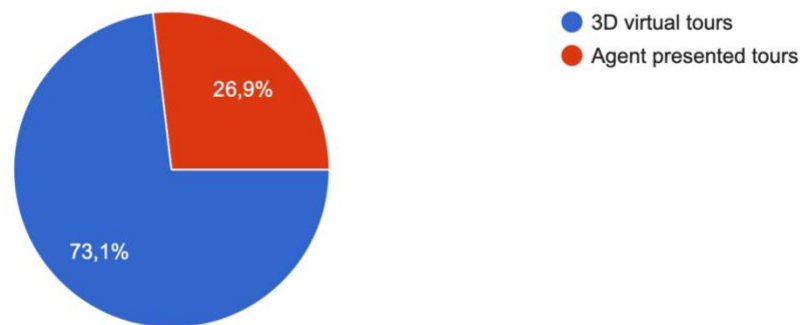


Figure 20 Buyers preferences

Perceived Novelty of 3D Virtual Tours vs. Video Tours

3D virtual tours take a great deal of credit for newness among these tools. A major 63.4% of respondents rated them as "mostly new" and 27.7% rated them as "almost new." That implies 3D virtual tours are almost perceived as a new feature in the property search process, and their newness surely aids in gaining more attention and interest from buyers. More proportionately, it is that sense of novelty which makes 3D tours appealing to the buyers as an exciting, futuristic way of exploring properties. Agent-presented video tours, if less new, would nevertheless typically maintain a perception of newness. A strong 72.3% rated them as "mostly new" while 13.9% rated them as "brand new." These tours, while less engaging and interactive than watching 3D tours, still provide relief from the mainstream approach of viewing properties. The rating of agent-presented video tours as "brand new" by 14% implies that, for some buyers, this avenue holds new locus and vigor for property experience.

How would you rate the level of Novelty of 3D virtual tour searching?

101 réponses

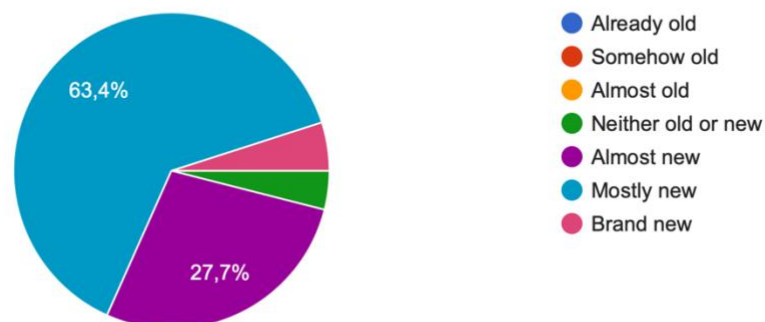


Figure 21 3D Novelty

How would you rate the level of Novelty of Agent presented video tour searching?

101 réponses

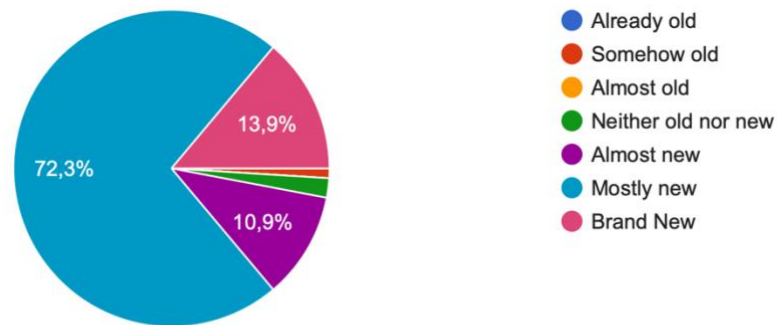


Figure 22 Video novelty

Enjoyment and Hedonic Experience

It is agent-presented video tours that stand out as noticeably more enjoyable or hedonic experiences. Around 62.4% have attached the label of "enjoyable" on such tours, with a further 27.7% giving such tours a "mostly enjoyable" rating. Hence, video tours benefit not just with regards to usefulness but also in providing exciting experience to buyers. Perhaps the most critical element is the human agent presenting the actual physical tour because that can really enhance the feel of connection and personal engagement with that property, thus reflecting higher happiness indexes. Enjoyment, on the other hand, was not as high for 3D virtual tours; only 5.9% of respondents listed that they were "enjoyable," while 52.5% held them "mostly enjoyable" in that same regard. Unlike neutral-ocean 3D tours, they are rather perceived as interesting and immersive but would not perhaps deliver the same emotional connection as those presented via agent videos. This experience thus follows a pattern of expected hedonic differences brought about due to the absence of human presence during the 3D tour rendering, thus causing it to feel less intimate for some customers. Nonetheless, in contrast to the way they are seen, these 3D virtual tours are evidently loved by most buyers, as a rather sizeable proportion still identified them as enjoyable or mostly enjoyable.

How would you rate the level of Hedonic (enjoyment) of 3D virtual reality property searching?

101 réponses

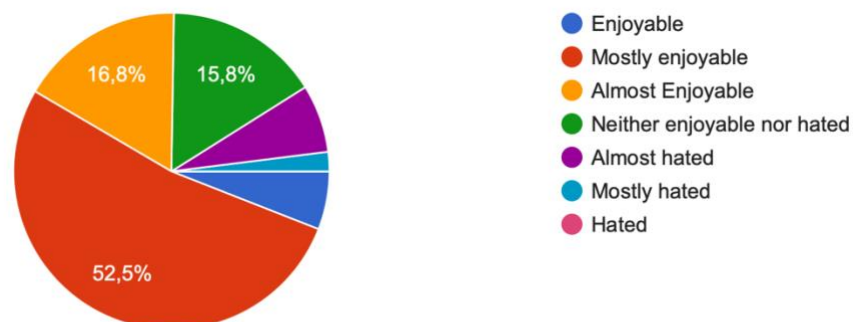


Figure 23 3D enjoyment

How would you rate the level of Hedonic (enjoyment) of Agent presented video tour property searching?

101 réponses

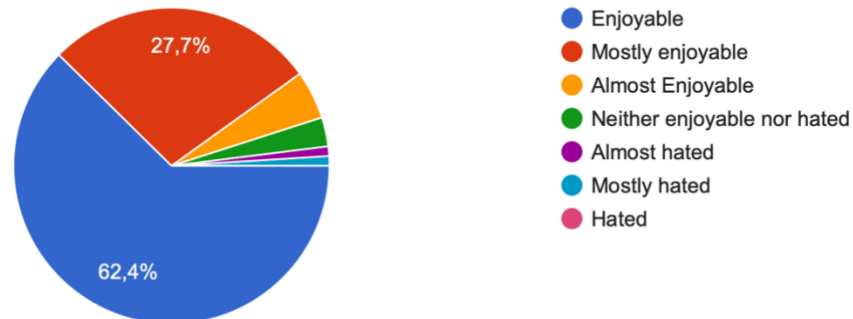


Figure 24 Video enjoyment

Ease of Use and Ergonomy

In addition, virtual video tours were deemed almost infinitely easier for users compared to 3D virtual tours. This is substantiated by the fact that 74.3 percent of respondents rated the video tour as easy to use, indicating that, on the whole, buyers find these tours easy and friendly to use. In video tours, buyers typically have little interaction, simply watching a pre-recorded or live-streamed video. Hence, it is super easy for even buyers without technical knowledge or advanced equipment to maneuver.

In contrast, 16.8 percent of respondents found the 3D virtual tour easy to use, while 40.6 percent felt it was mostly easy to use. While the majority considered the 3D virtual tours to be user-friendly, the complexities involved in navigating these immersive environments may prove to be troublesome to certain buyers. A handful of respondents (6.9%) rated it as practically unusable: suggesting that for certain people, interacting with the technology is either counterintuitive or just plain hard to get a grasp on. However, the fact that most respondents found the 3D virtual tours easy to use acknowledges that these tours are essentially very accessible, with the caveat that a few users may have experienced difficulties.

How would you rate the level of Ergonomy (easyness to use) of 3D virtual reality in property searching?

101 réponses

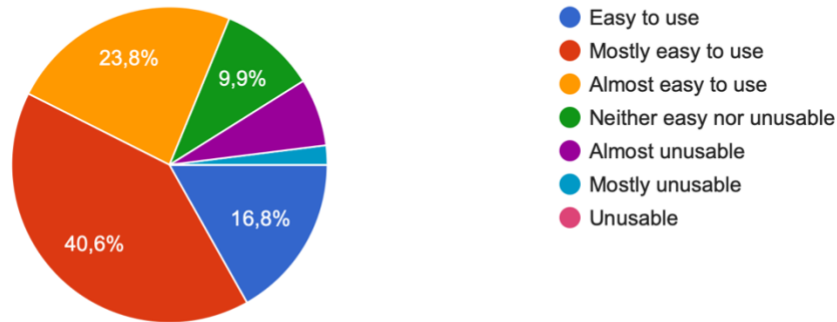


Figure 25 3D ergonomy

How would you rate the level of Ergonomy (easyness to use) of Agent presented video tour in property searching?

101 réponses

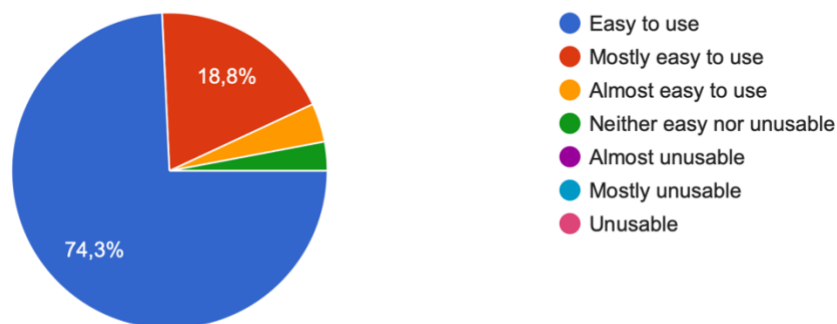


Figure 26 Video ergonomy

Overall Preferences and Trends

Yet despite it all, some preferences emerge in clear favor of 3D virtual tours. This is what has generally been evidenced in the survey results by buyers who now can appreciate the advantages of going through properties more interactively and immersively. In contrast to this, agent-presented video tours would be the easiest, most appealing of tools-Typically useful for those who want more of a human connection or less complex experience than viewing an entire tour.

That shift is implied in the results for a growing trend toward digital and virtual tools in the property-buying process, with 3D virtual tours and agent-presented video tours taking cues as both having significant contributions. They seek new and easy avenues to view properties remotely, and those two are maximally meeting that demand differently. 3D virtual tours offered a level of interactivity and immersion, but video tours provided the simpler, familiar experience with the preference directed toward human engagement.

Both tools cater to different preferences and needs, suggesting that future property searches could feature a combination of both to maximize engagement, convenience, and user satisfaction. As technology enters new evolutions, these will likely be even more refined and made available for use and equipped with even more valuable features to improve the tale of property buying.

4.4 Barriers to adoption

The barriers that come in the way of adopting new technology like 3D virtual reality or agent-presented video tours might be many; from the technical limitations to concerns of accuracy and user experience, these barriers are several. Understanding these barriers becomes a key requirement for evaluating the use of such tools in real estate. In the succeeding subsections presented are the relatively, unfiltered concerns if any raised by respondents on each tool.

Barriers for 3D Virtual Reality Tours

The number-one obstacle that participants had to deal with regarding 3D virtual reality tours was the lack of compatibility with personal devices, noted by 32% of the respondents. It calls for certain devices, like VR headsets or very high-performance computers, to get the fullest experience of these tours. However, 62.9% of respondents said they feel comfortable using 3D virtual tours. What other problems accounted for people's hesitance, minor as they were, included a lack of faith in the virtual presentation's accuracy (7.2%), and potential for motion sickness or discomfort (7.2%). The number of respondents raising these issues suggests that bulk users either believe the tours are accurate or do not feel discomfort.

What concerns or barriers, if any, do you have regarding the use of 3D virtual reality tours for real estate? (Select all that apply)

97 réponses

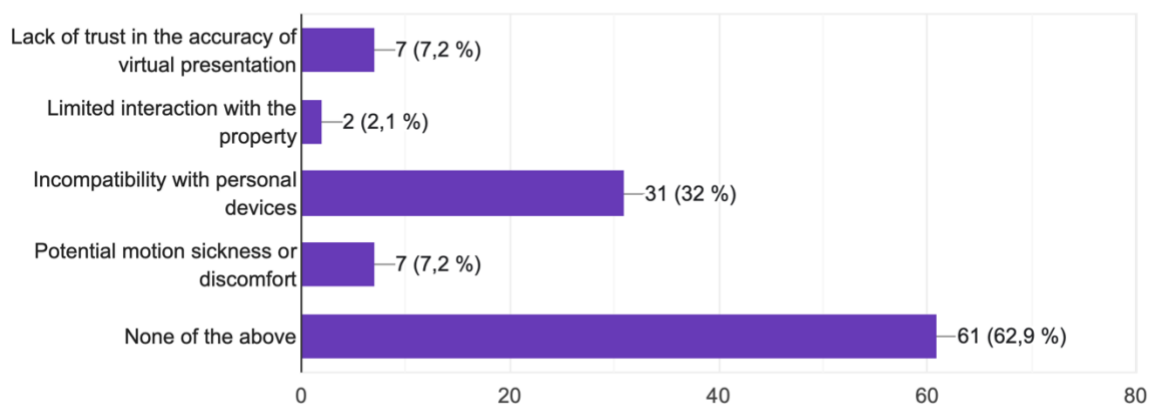


Figure 27 3D concerns

Barriers for Agent Presented Video Tours

The major contention among respondents regarding agent-presented video tours, cited by 77.3%, was limited interaction with the property. This was evident from the fact that video tours, unlike 3D tours, did not offer the viewer a means to interact with or explore the property.

The second major roadblock for 60.8% of the respondents was the mistrust in the virtual presentation's accuracy. It meant that some buyers may think that the video tour does not show the property truly or that the agent is perhaps highlighting only some of its features.

Far fewer respondents (2.1%) felt there were issues with compatibility with their personal devices, a much lesser issue than in the case of 3D virtual tours. Motion sickness or discomfort while using agent-presented video tours was never reported.

What concerns or barriers, if any, do you have regarding the use of Agent presented video tour for real estate? (Select all that apply)

97 réponses

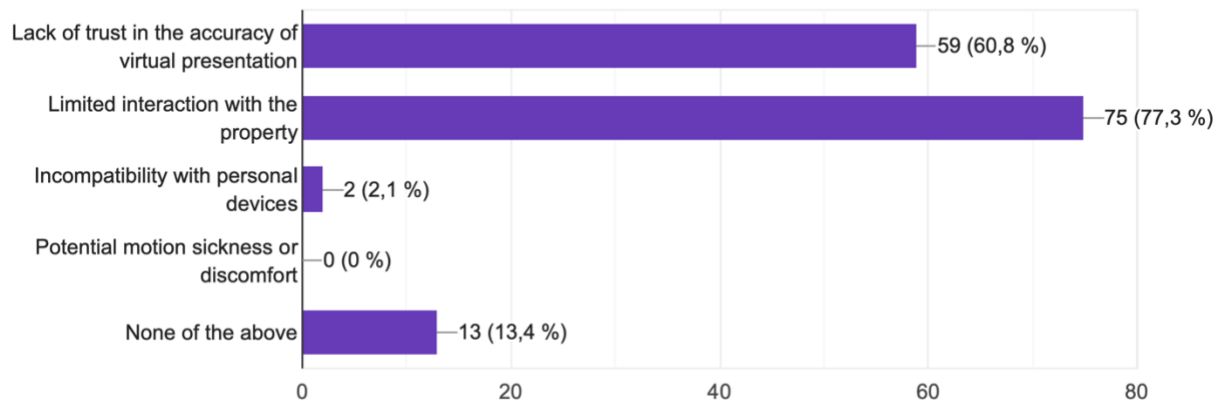


Figure 28 Video concerns

Summary of Barriers

The data points to a few varied concerns for each tool. For instance, device compatibility proves to be the greatest issue regarding 3D virtual tours, while agent-presented video tours are mostly questioned on their limited interaction with the property. Though a great deal of respondents wished to remain barrier-free, the issues raised need to be addressed in order to improve the adoption and effectiveness of these two tools in real estate.

4.5 Buying Intentions & Recommendation Behaviour

Buying Intentions

Digital property conveyancing is gaining high approval ratings with a significant tilt towards the technical side of real estate. There were a huge 71.3% share of respondents who said they would "probably" buy on the basis of 3D virtual reality tours, accompanied by 18.8% saying "definitely". Very few were undecided, with 6.9% neutral and 1% probably opposed.

In video tours presented by agents a very similar trend follows where 69.3% of respondents were supposedly saying that they would "probably" buy in this way while another 18.8% would apparently "definitely" purchase. A slightly larger measure of 4% would go with "almost" while 7.9% remained neutral. Importantly, no one rejected the idea of buying property via an agent-assisted video tour.

This suggests that indeed the population is somehow willing to use digital tools for property transactions, , the finding that none of the individuals outrightly rejected these methods indicates that they are becoming accepted as part of the real estate experience and not just an add-on.

How likely are you to buy a property using a 3D virtual reality interface?

101 réponses

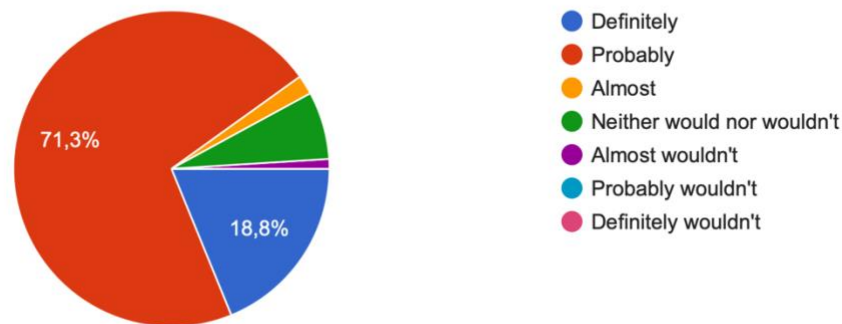


Figure 29 3D buying intention

How likely are you to buy a property using a Agent presented video tour interface?

101 réponses

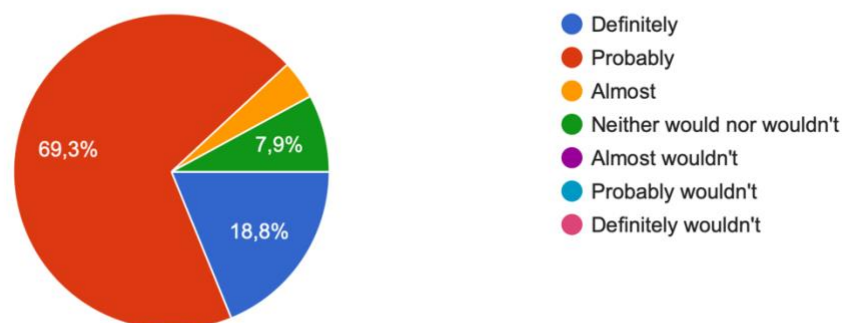


Figure 30 Video Buying intention

Willingness to Use for Property Browsing

There is also a strong perspective on using these facilities to look for available properties aside from purchasing. Almost 80% of the respondents had a positive opinion when asked if they seek out specific real estate agencies with 3D virtual reality tours, 16.8% strongly agreed, and 51.5% mostly agreed. Only 5% said they will be less active in seeking such agencies.

The agent-presented video tour received about the same answers. While 13.9% agree strongly and 49.5% agree mostly, preference overall was just slightly above that of the 3D virtual tour, with more than 80% indicating that they would look for agencies providing this feature.

When it comes to whether they would personally use these tools, augmented responses in favor of this development indeed bore out. Strikingly, 67.3% strongly affirm the use of 3D virtual reality tours, while 58.4% of the same testify to the same inclination toward agent-presented video tours. The rest of the respondents dipped mostly on the agreement side, with only a few showing reluctance.

These indicate that buyers are not merely receptive but do actually expect real estate agencies to afford them such technologies.

I would look for real estate agencies using 3D virtual reality tours to browse through properties.

101 réponses

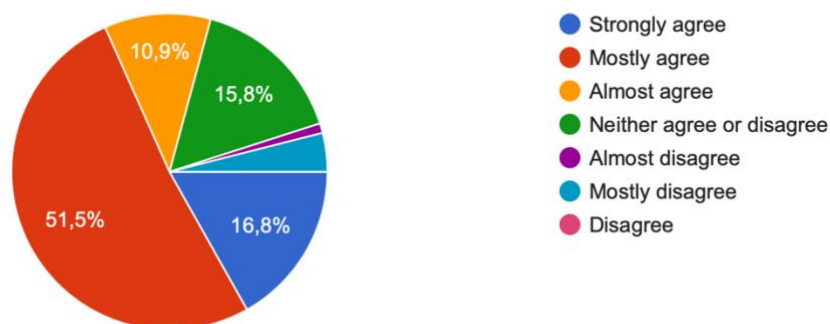


Figure 31 3D agencies

I would look for real estate agencies using Agent presented video tour to browse through properties.

101 réponses

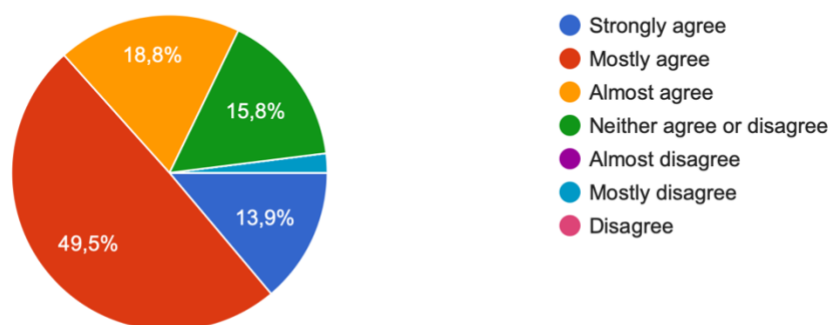


Figure 32 Video agencies

Willingness to Use on a Regular Basis

The tools offer benefits that attract frequent use, as many respondents indicated they expect to incorporate these tools into their regular property searches. 3D virtual reality tours clearly carried the heaviest weight with an outstanding 61.4% strongly agreeing that they would use the tours frequently, followed closely by 23.8% mostly agreeing. Agent video tours followed closely behind with 54.5% strongly agreeing and 30.7% mostly agreeing that they would use them frequently.

I am willing to use 3D virtual reality tours on a regular basis to browse through properties.
101 réponses

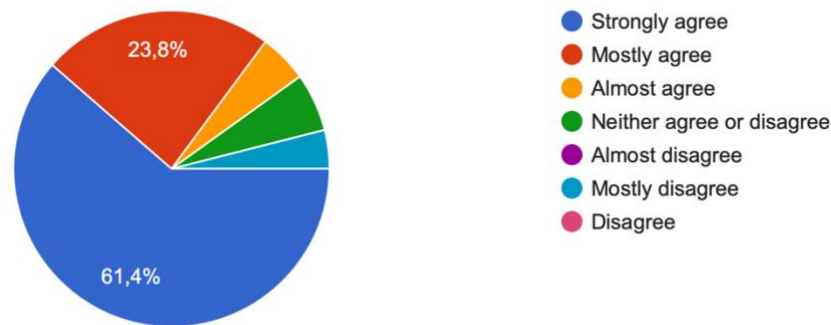


Figure 33 3D daily basis

I am willing to use Agent presented video tour on a regular basis to browse through properties.
101 réponses

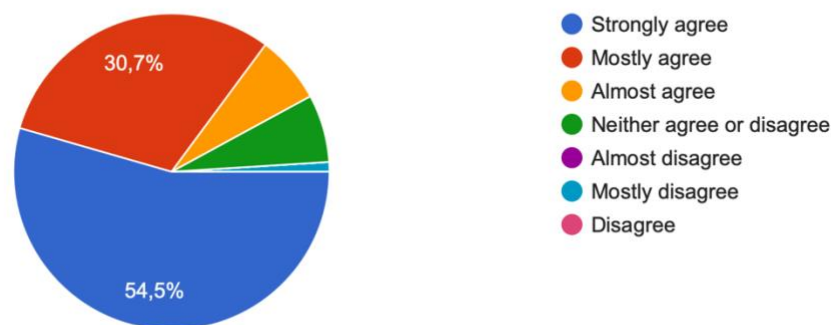


Figure 34 Video daily basis

Willingness to Use Despite Time Consumption

These digital means have the potential to be time consuming, yet this concern seems to be brushed aside by the buyers. There really was 62.4% of respondents who said they would use 3D virtual reality tours even if they took longer, while another 19.8% would say mostly agree. Only a small 5% leaned towards disagreement. Similar results were seen in the agent-delivered video tours, which is where 58.4% said they would still use them even if it cost some time. 5.9% was interesting in that they also remained neutral with

this case, which might indicate that while some of them might consider taking some guided tours, they would find it less interesting if they took too long on such tour.

I am willing to use 3D virtual reality tours to browse through the properties despite it being more time consuming.

101 réponses

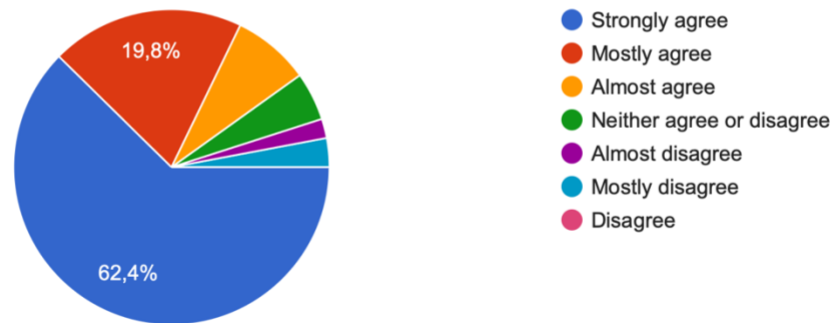


Figure 35 3D despite time consuming

I am willing to use Agent presented video tour to browse through the properties despite it being more time consuming.

101 réponses

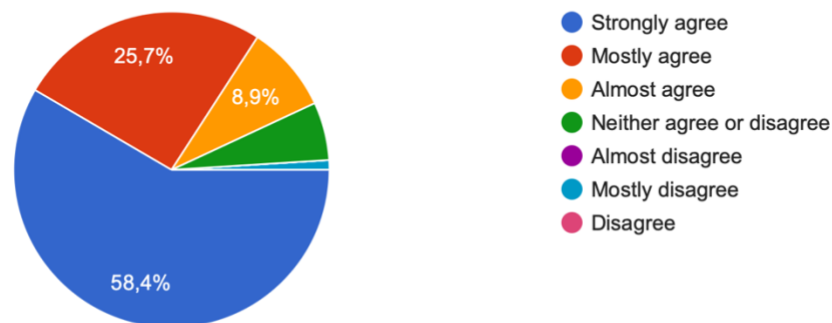


Figure 36 Video despite time consuming

Perceived Reliability

There are highly important factors that can greatly affect the acceptance of any digital tool like 3D virtual reality and an agent-presented video tour. For example, 3D virtual reality seems to have garnered some reliable marks, making 51% of respondents feel that it is indeed "reliable," while only 34% rated it "mostly reliable." As for the remaining 2% deemed it as "unreliable."

While 3D virtual reality scored highest on reliability, agent-presented video tours scored lower but still highly regarded in this area. Only 8.9 percent of respondents considered it to be "reliable," while 40.6 and 33.7 percent considered it "almost reliable" and "mostly reliable," respectively.

Although both prove to be fairly accepted as reliable, a degree of additional assurance seems to be associated with virtual reality. This is probably owing to the user being able to explore the space by themselves rather than risk being led through selective framing or subjective representations sometimes typical with an agent's video representation.

How would you rate the level of Reliability of 3D virtual reality in property searching?

100 réponses

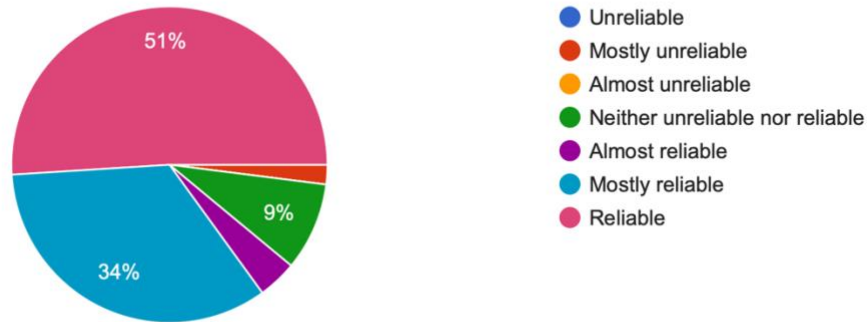


Figure 37 3D reliability

How would you rate the level of Reliability of Agent presented video tour in property searching?

101 réponses

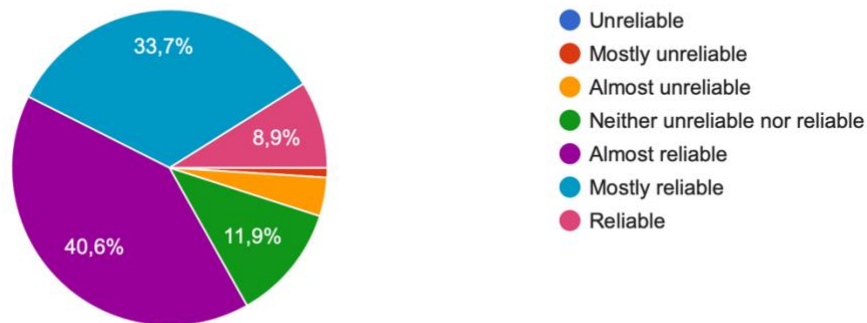


Figure 38 Video reliability

Perceived Impact on Property Searching

Most strongly positive feedback was received when asking customers how much they accepted such automated tools to enhance the property search experience. Of those respondents, 62.4% felt that 3D virtual reality tours would "extremely" improve their experience, and 17.8% were probably inclined to say it would be "very significant"-while fewer than 9% thought that the effect would be moderate or lower.

Agent offered video tours earned positive reports, but not as exciting and was "extremely" high impact to only 13.9%, whereas 30.7% deemed them "very significant" and 37.6% termed them "significant." The surrounding greater excitement toward virtual reality is probably because of the direct and immersive

qualities associated with it. It would seem as though the buyer was interacting into the space rather than just watching a presentation of a vehicular video tour.

How much do you think 3D virtual reality technology could improve your property searching experience?

101 réponses

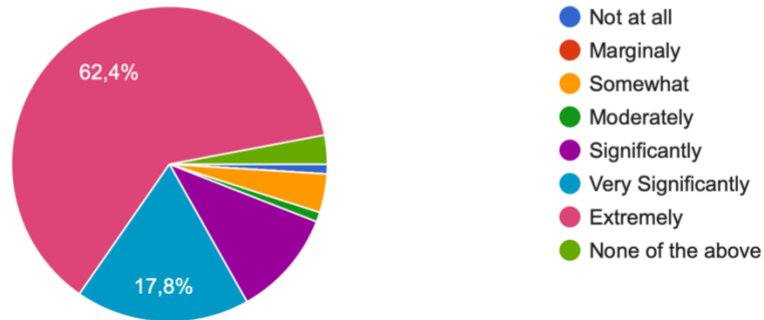


Figure 39 3D improve

How much do you think Agent presented video tour technology could improve your property searching experience?

101 réponses

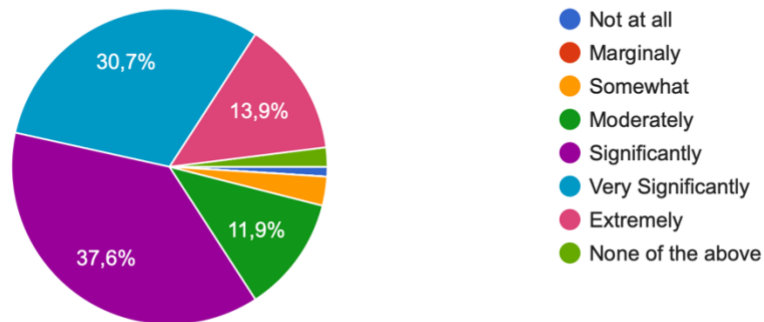


Figure 40 Video improve

Willingness to Recommend

The fact that they would recommend these instruments is yet another clear sign of their growing acceptance. A question posed for consideration asked whether respondents would encourage real estate agencies to adopt 3D virtual reality tours; the majority of 58.4% answered "mostly likely," while 12.9% chose the option "almost likely." The proportion of hesitant respondents was tiny.

In agent-presented video tours, recommendation scores dipped slightly but remained strong, where 46.5% said they're mostly likely to recommend, followed by almost likely at 19.8% and likely at 22.8%.

When directly asked whether these tools would be encouraged by respondents, 57.4% strongly agreed they would recommend 3D virtual reality tours, with 43.6% voicing similar sentiments about video tours. This difference denotes that although both tools carry some weight, virtual reality tours are perceived to have a wider application.

How likely are you to recommend to your friends and colleagues real estate agencies using 3D virtual reality Interface?

101 réponses

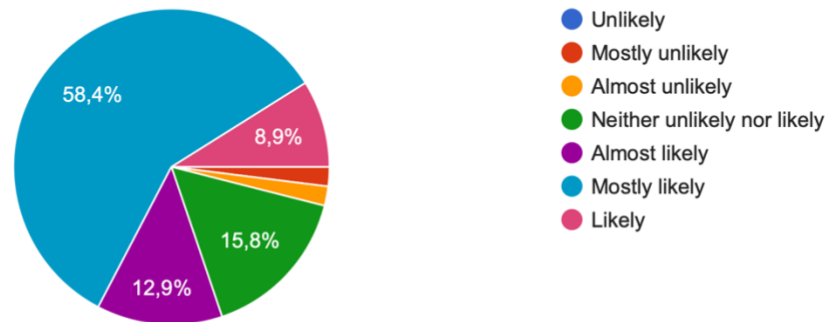


Figure 41 3D recommend

How likely are you to recommend to your friends and colleagues real estate agencies using Agent presented video tour Interface?

101 réponses

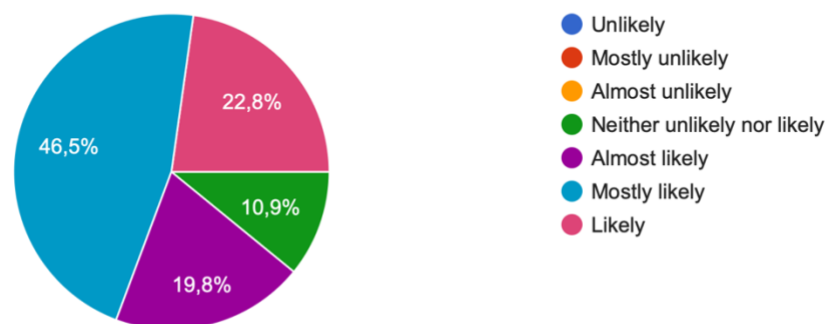


Figure 42 Video recommend

Summary

The results unequivocally indicate a trend: buyers are more and more inclined towards using digital tools for real estate purposes, and they see true value in the 3D virtual tours as well as in the agent-presented video tours. Both offer generally positive acceptance, yet, with respect to their perceived impact, trustworthiness, and recommending options, virtual tours remain consistently ahead in all three categories. This might indicate that buyers appreciate the self-direction and experiential quality virtual tours provide, with video tours being a very strong alternative option for buyers who prefer a guided presentation.

With such overwhelming endorsement for these technologies, real estate companies wishing to remain competitive should seriously consider applying these technologies to their service offerings. As buyers become adept at using digital tools, the agencies that provide engaging and quality virtual experiences might find a considerable advantage in attracting and retaining the clients.

4.6 Paired Samples t-Test

		Paired Samples Test							Significance	
		Paired Differences			95% Confidence Interval of the Difference		t	df	One-Sided p	Two-Sided p
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper				
Pair 1	Engagement 3D - Engagement Agent	-,730	,863	,086	-,901	-,559	-8,460	99	<,001	<,001
Pair 2	Attention Grabbing 3D virtual - Attention grabbing Agent	-,891	,989	,098	-1,086	-,696	-9,055	100	<,001	<,001
Pair 3	Usefulness 3D - Usefulness Agent	,802	1,030	,102	,599	1,005	7,827	100	<,001	<,001
Pair 4	Novelty 3D - Novelty Agent	-,257	,783	,078	-,412	-,103	-3,304	100	<,001	,001
Pair 5	Hedonic 3D - Hedonic Agent	-1,158	1,037	,103	-1,363	-,954	-11,230	100	<,001	<,001
Pair 6	Ergonomy 3D - Ergonomy Agent	-1,198	1,105	,110	-1,416	-,980	-10,899	100	<,001	<,001
Pair 7	Attractiveness 3D - Attractiveness Agent	-1,030	1,144	,114	-1,256	-,804	-9,045	100	<,001	<,001
Pair 8	likely buy using 3D - likely buy Agent	,010	,360	,036	-,061	,081	,276	100	,392	,783
Pair 9	likely recommend agencies using 3D - How likely are you to recommend to your friends and colleagues real estate agencies using Agent presented video tour interface?	-,307	,857	,085	-,476	-,138	-3,598	100	<,001	<,001
Pair 10	How would you rate the level of Reliability of 3D virtual reality in property searching? - How would you rate the level of Reliability of Agent presented video tour in property searching?	,930	1,139	,114	,704	1,156	8,163	99	<,001	<,001
Pair 11	How much do you think 3D virtual reality technology could improve your property searching experience? - How much do you think Agent presented video tour technology could improve your property searching experience?	,921	1,083	,108	,707	1,135	8,542	100	<,001	<,001
Pair 12	I would look for real estate agencies using 3D virtual reality tours to browse through properties. - I would look for real estate agencies using Agent presented video tour to browse through properties.	,000	,616	,061	-,122	,122	,000	100	,500	1,000
Pair 13	I am willing to use 3D virtual reality tours to browse through properties. - I am willing to use Agent presented video tour to browse through properties.	-,040	,836	,083	-,205	,125	-,476	100	,317	,635
Pair 14	I am willing to use 3D virtual reality tours on a regular basis to browse through properties. - I am willing to use Agent presented video tour on a regular basis to browse through properties.	-,010	,794	,079	-,167	,147	-,125	100	,450	,900
Pair 15	I would recommend others to use 3D virtual reality tours to browse through properties. - I would recommend others to use Agent presented video tour to browse through properties.	,059	,892	,089	-,117	,236	,669	100	,253	,505
Pair 16	If 3D virtual reality tour were available I will use them to browse through the properties. - If Agent presented video tours were available I will use them to browse through the properties.	-,089	,850	,085	-,257	,079	-1,054	100	,147	,294
Pair 17	I am willing to use 3D virtual reality tours to browse through the properties despite it being more time consuming. - I am willing to use Agent presented video tour to browse through the properties despite it being more time consuming.	-,069	,828	,082	-,233	,094	-,841	100	,201	,402

Figure 43 Paired sample t-test

Pair 1 - Engagement: The agent-presented video tours were found by participants to be significantly more engaging than the 3D virtual tours ($p < .001$). Hence, it stands to reason that introducing a human figure, associated with a voiceover and guided narration, perhaps ends up creating a more dynamic experience that captures attention and keeps the viewer engaged throughout the video.

Pair 2 - Attention-Grabbing: The agent-presented video tours were also judged in a significant sense more attention grabbing than the 3D virtual tours ($p < .001$). This finding shows storytelling and human involvement relevance in marketing, because such has been found not only to evoke interest but probably to create initial possibilities of favorable responses to the property.

Pair 3 - Usefulness: For agent-presented video tours, users found them significantly more useful than less formal 3D tours ($p < .001$). Perhaps this is because the explanatory material is presented as part of the video, which potentially distills information into much simpler terms with less cognitive effort than if the 3D tour had to be navigated on one's own.

Pair 4 - Novelty: Interestingly, however, 3D virtual reality tours were found to be much more novel than videos presented by agents ($p < .001$). This corresponds with the fact that such experiences - the most immersive, technologically forward - will always be a little out of the ordinary for the users when set against a more traditional video format.

Pair 5 - Hedonic Value (Fun): Perhaps in emotional enjoyment, agent-presented video tours were rated as significantly more fun and more enjoyable than 3D tours ($p < .001$). This could be due to their narrative style, visual storytelling, and perhaps entertaining or charismatic presentation styles that make the experience pleasant.

Pair 6 - Ergonomics (Ease of Use): Participants found agent videos to be vastly easier to use than 3D virtual tours ($p < .001$). This is indicative that the passive act of watching a video is more comfortable and intuitive than navigating around in a 3D environment for those not used to interactive tools.

Pair 7 - Attractiveness: Agent-presented videos were rated to be significantly more attractive in visual appeal and in the style of presenting video tours ($p < .001$). This argues that the professional editing of the video along with an engaging visual and voiceover has stronger aesthetic impact than a 3D walkthrough.

Pair 8 - Willingness to Buy: Neither tool manipulated the user into showing a definite difference in willingness to buy property ($p = .783$). This thus makes one think that while the tools may very much affect perception and experience, somehow, they would not have a direct effect on the odds of making a really high-stakes decision, like purchasing.

Pair 9 - Willingness to recommend agencies: Participants were many times more likely to recommend agencies that used agent presented video tours to non-users ($p < .001$). This reflects positive brand association with modern and professional client-friendly communication methods that might pay off for agency reputation.

Pair 10 - Reliability Judgment: The stimuli of 3D tours seemed significantly more reliable as compared to photos or agent videos on the scale, with ($p < .001$). This could be attributed to the increased transparency of 3D tools. They allow viewers full control of the act of exploration and thereby enable a better assessment of space, which in turn might increase trust.

Pair 11 - Improvement in Search Experience: 3D virtual tours were also rated as significantly more effective in enhancing the overall experience of searching for property, considering the vi and 3D tours, rated at ($p <$

.001). This indicates while videos engage people emotionally, 3D tours have an advantage in quantifiable uses of property evaluation, including comparison.

Pair 12 - Preference for Agencies Utilizing the Tool: Participant's preference for the use of the tool over another was not found to be statistically significant ($p = 1.000$).

Pair 13 - Willingness to Use in General: There was no statistically significant difference in the willingness of participants to use either tool while searching for property at a low level of significance with ($p = .635$). The fact that both emerged as clearly acceptable in their role during the property search signifies a nonpartisan concept of acceptability.

Pair 14 - Willingness to Regularly Use the Tool: There was no significant difference between the two things in terms of user willingness or disposition to use either of them regularly. An insignificant value of ($p = .900$) was observed.

Pair 15 - Recommending the Tool to Others: The consumers did not mind recommending both equally to others ($p = .505$), which supports no obvious user bias in putting one over the other.

Pair 16 - Willingness If the Tool Were to be Available: Their decision to use either tool did not show a significant difference either ($p = .294$) assuming that availability in itself was not a cause for deciding to use the tool over the other.

Pair 17 - Willingness Despite Time Needed: Last but not least consideration would take place on whether the two methods would cause such a time-consuming affair as to refrain from any desire to utilize the tool ($p = .402$). Clearly, time is not a deciding factor, making way for other factors like utility or enjoyment.

5 Discussion

5.1 Limitations, reliability, and validity

Limitations

One limitation of this research is the size of the sample. Although the target of getting 100 respondents was achieved, it should be mentioned, since the luxury real estate market is such a small niche with so few active buyers and sellers, even this sample of 100 respondents would constitute a high part of its target audience: They should be interpreted cautiously, however, as a greater sample could show a broader view of the impact of digital tools in real estate transactions.

Another limitation of the sample was its stratifying (type of sampling method). Thus, for all those respondents who participated in the survey, most of them (70% and above) fell within the age range of only 26-57, 70% of the respondents claimed to be males, and around 80% were French. Of these, more than half were entrepreneurs with 27% of the sample making up the employees. Such literacy might have affected the outcome of the analysis since some perspectives

could be on age, profession as well as knowledge around technology on how different individuals understand the digital tool. A broader sampling, particularly that in which a higher percentage of international participating buyers and older demographics participated, would have provided even more useful insight into general liking spanning the market segments.

Another aspect related to data collection still challenged this study. Initial approaches were directed to a specific pool of buyers and sellers, but recruitment problems forced more general dissemination. This amended the requisite participant number but, because of these broader parameters, may also mean that many respondents have not engaged recently with luxury real estate purchases. Besides, a number of respondents did not complete every question, most particularly at open-ended sections, which might limit some of the deeper qualitative insights derived.

Deduction of response bias: there were no strong variations that were found in the data influencing responses as genuine. In many studies, social desirability bias can bring a participant to give a more favorable response; in this case, however, no strong evidence that respondent rebuttal has been stated on higher willingness to use the digital tools in real estate could be gleaned. The variations in responses in different sections further support the fact that respondents actually replied according to their natural experiences as well as proclivities rather than merely trying to conform to perceived expectations.

Reliability

It is clear that the reliability of the study has been ensured through the well planned survey design and pre-testing. In fact, questions were put in such a simple and straightforward manner, so that every answer would be conclusive, without any ambiguity. There were no negative comments concerning the question clarity and a tiny pre-test was done with few clients to take them through the survey and ensure that the wording used reflected clarity and comprehension. Ultimately, it ensured consistent interpretations in order to minimize the possibilities of misinterpretations.

In this regard, repeatability and structured format survey with the consistency of responses would demonstrate, in case this study were repeated in similar luxury real estate markets, the same answer would be found. Other locations would, however, be characterized by different buyer expectations, local market conditions, or differing levels of technology adoption that could lead to different results.

Validity

Internal Validity

It is commendable how the study managed to measure buyer preferences and perceptions for digital real estate tools. The aim of the survey was to encapsulate quantitative (for example, 3D virtual tours or agent-presented videos) and qualitative (for instance with respect to reasons for preferences) data. The questionnaire was structured so as to allow for consideration of relevant key variables with regard to buyer decision-making.

An external influence was affected: that is, the long-time influence of the COVID-19 pandemic. From one angle, it can be said that although surveys were conducted post-pandemic, the increased dependence on digital tools during the lockdown implementation may have created a long-lasting impression on buyer perceptions. In a way, this poses yet another context rather than a limitation for the results to be interpreted through.

External Validity

Importantly, while the results largely portray the high-end market of Biarritz, the end phase of processing incorporated the responses from other markets, bringing an important comparative angle into the analysis. This partial diversification increases the external validity of the study although the generalization of findings to all luxury real estate markets should be mandated with caution.

Had the survey focused solely on real estate investors-as opposed to buyers, results would have significantly differed because investors, who mostly go to several properties in a short time and travel with

a high frequency, might give higher importance to digital tools that allow them to rate and compare the properties. This could further portray a strong direction of inclination toward replacement of actual visits with virtual solutions. Therefore, though the study adds valuable insights into understanding the market better, it should be appreciated that different buyer segments might have different adoption patterns for digital real estate technologies.

Construct Validity

The key concepts meaningfully measured in this study were 'trust' in virtual tours and 'realism' within videos presented by agents. These terms were, therefore, clearly defined within the study. Results are consistent with contemporary work in digital real estate marketing, which affirms that although viewing tools facilitate browsing, their overwhelming reliance does not mean that physical visits become completely unnecessary for most buyers. This convergence of findings with past literature strengthens the reliability of the conclusions reached in this study.

Thus, although the study faced some limitations in terms of sample diversity and data collection difficulties, the study is reliable and valid within its boundaries. The methodology ensured the accurate measure of buyer preferences and thus provided important evidence into the evolving role that digital tools are playing in high-end real estate transactions.

5.2 Answering the research questions

As stated at the beginning of this study, the main research question for the purposes of this paper was to assess what impact 3D virtual tours and agent-presented video tours have in the luxury real estate sector from the buyers' perspective. To answer this question thoroughly, both qualitative and quantitative data were obtained and analyzed. These findings reveal insights about perceived usefulness, engagement, and the impact that these two digital marketing tools have in the property evaluation process and environment of the buyer experience.

Firstly, quantitative data derived from SPSS analysis indicated that there were some significant differences in the perceptions of the participants of the two tools. Agent-presented video tours received consistently better ratings for engagement, attention, perceived usefulness, fun, ergonomics, and visual attractiveness. By contrast, 3D virtual tours were seen to be more novel, more trustworthy, and more contributory to the enhancement of the overall property search task. However, it was found that there were no significant differences in respect to attitudes toward the most critical behaviors in decision-making-type situations, such as intention to buy a property, to use it regularly, or to recommend it to others. This means that while both tools do have a unique way of highlighting the customer experience for each of them, neither of them stands out significantly enough to make the decision by itself.

Qualitative findings juxtapose quantitative results, greatly contributing on further understanding. Several participants stated that the 3D tours, albeit informative, can be hard to use on mobile devices, which may explain their low ergonomics rating. Others appreciated 3D tours for imparting a sense of spatial awareness and accuracy that did, in their opinion, considerably increase perceived dependability and perceived search enhancement. Agent-presented videos, however, were thought to be more interactive and fun—often being likened to a guided tour, helping buyers imagine themselves in the space better. Some would suggest a happy medium where a combination of both tools is used, stating that each tool has its strength.

In summary, the analyzes show that both 3D virtual tours and agent-presented video tours act in a significant way on the luxury real estate market from the buyer's point of view,; but while agent videos appear to act by enhancing the experience viewing and emotional involvement, increasing the agency's image and enjoyment of users, 3D tours are based on a promise of transparency and autonomy that converts into a more technical understanding of the space. None of the two tools demonstrated any

statistically significant advantage over the other in terms of final purchase decisions or exclusive loyalty to one format, but both received excellent reviews generally. Users expressed a tendency toward employing again agencies with such tools, suggesting overall beneficial effect on agency perception. This indicates that while there is no difference at all, it does not undermine their worth; rather, it suggests integration of both types is appreciated and viewed as valuable to buyers. Therefore, perhaps the best option is the combination of both tools, as that would enhance the complete most satisfying experience during search for luxury properties.

5.3 Dialogue between key results and knowledge base

This study makes known that the three-dimensional virtual tour and video tours of the agents induce the attentiveness and engagement of buyers in the property searching process concerning the luxury real estate market. In the end, however, people usually feel that these two options do help during the final cut but do not really substitute for seeing it themselves. This observation has high agreement with the work of Hussin et al. (2023) while analyzing the immersive propensities of virtual reality in real estate marketing; there are also barrier factors such as unawareness and perceived technological complexities in such an area. This study confirms those limitations as there were respondents who expressed challenges with 3D tours on mobile devices or found the tools less intuitive.

Besides that, this research adds a different perspective to emotionally persuasiveness and also showed the influence of video tours presented by agents, which has not been explored in such a context previously. Although Brenner (2017) stated that VR enhanced virtual staging encourages property visits, especially regarding the hot markets, it did not include how agent-led videos as channels impacted property marketing strategies. Video types led by agents are perceived to be more personal, more emotionally engaging, and therefore particularly effective tools in the luxury segment, where the storytelling has the human aspect at the heart of the process of decision-making.

In conclusion, studies by the author add to current literature confirming positive effects of virtual reality on the effectiveness of campaigns, while revealing some of the limitations present. They then add to the book of knowledge by introducing agent-led video as an instrument in marketing. Therefore, these two methods lead to more complex understanding as to how digital tools shape buyer decision-making and emotional engagement in high-end real estate.

5.4 Compliance with research ethics guidelines

All participants remained privately anonymous and confidential throughout the entire research study as part of ethical research. Respondents were informed of the study's purpose before engaging in any study activities, completing the survey under an assumed consent construct by completing it voluntarily. Personal and identifiable information were neither gathered nor shared; the individual views were entirely engorged with analysis and presented in aggregate form in favor of one's privacy protection. In addition, all academic sources cited in this work have been acknowledged according to academic integrity principles, which ensure the research's transparency and credibility.

6 Conclusions

The aim of the study was to evaluate buyers' perceptions of 3D virtual tours and agent-uploaded video tours as they pertain to luxury real estate field. Quantitative analysis and survey responses of the study have tried to tap into the parameters of buyer engagement in preference to an agency and the necessity that may underlie the consideration of making the site visit concerning these digital options.

In the analysis, it has been revealed that there was a broad-based acceptance from buyers who appreciate the unique advantages each one offers. While agent-presented video tours are engaging and easy to follow, the 3D virtual tours are considered to be more accurate in representations of the homes and offer a greater freedom of exploring these spaces on their own. Notably, both technologies used independently did not greatly affect buyers' willingness to purchase or choice regarding agency exclusivity; rather, the two provide auxiliary support whereby the clients can preselect properties, thus reducing the need for actual in-person visits.

They do not replace physical visits but serve some very important still, different purposes in the initial phases of decision making. Hence, luxury real estate firms should keep or increase their investment and marketing in both formats, to increase their usability and visibility so that they can fully tap the potential of attracting and holding prospective buyers.

6.1 Key Findings

Increasingly, they show how digital tools influence the buyer's mentality and how a buyer makes decisions; this is most pronounced in the luxury real estate category concerning 3D virtual tours and agent-presented video tours. Evaluation of properties in a convenient, clarifying, and early-in-the-process manner makes for an enhanced experience and overall convenience for buyers who desire to take their time in deciding which ones get shortlisted. Both mediums were found to be of great value in engaging buyers; the 3D virtual tour offers independent navigation, while the agent-led video tour affords a more guided and emotionally engaging, captivating tour experience.

The buyers consider these tools not substitutive but complementary, thus arguably giving additional value to their combination. Although majority of the respondents acknowledged that digital tours could never be an alternative to a property visit, their presence, on the contrary, turned out to be a plus, showing modernity, professionalism, and competence. In addition, several love-hate attitudes were exhibited by respondents toward agencies that offered these digital experiences when deciding, meaning these tools influence agency preference.

These instruments alone do not significantly impact an ultimate decision on a sale or insulate loyalty. Rather, they greatly affect the earlier stages of the customer journey, which would include initial interest, trust-building, and agency selection. Thus, it deepens a well-informed, confident, and engaged buyer, reiterating the great position that these technologies hold in marketing luxury real estates.

6.2 Managerial implications

This research has strategic implications offering tremendous value for the luxury real estate business manager's consideration. Putting emphasis on the digital dimension within modern marketing is where this should first start. Technologies such as 3D virtual tours and agent video presentations greatly enhance client experience during pre-visit stages. These technologies engender far greater transparency and trust with the added benefit of enabling clients to visualize their property effectively, thus aiding in quickening the decision-making process.

Second, those two tools could be regarded as complementary by agencies. Joining them creates an even more immersive and informative journey for the potential buyer, where one is not preferred over the other. 3D tours take clients through their own journey with transferable benefits of spatial understanding, while agent-influenced video walks provide emotion and human connection, which is a key consideration in the context of luxury real-estate's high value.

Thirdly, because clients are found more inclined toward recognizing agencies utilizing digital solutions, thus, considering it from a real estate perspective, firms must express these tools as a competitive advantage representing innovation and professionalism. Beyond investing in digital capacity and training, high production quality and seamless user experience ought to be guaranteed.

Fourth, while these tools might not directly secure a purchase or loyalty, from a marketing standpoint they do drive influence into earlier touchpoints such as trust building, interest, and finally choosing which agency to go with, all key points in the buyer's journey. Managers should ensure that digital presentations crop up as the manifestation of their broader branding agenda, with endeavors toward a tonal, messaging, and visual aesthetic coherency that is built to influence brand credibility.

Lastly, their role should extend from marketing to fostering relations with clients. Follow-ups, personalized messages, and data-driven insights through digital engagement will further tailor services and strengthen client relationships, creating the potential for referrals.

Thus, by adopting this digital innovation and considering these as value-added services, luxury real estate managers would attract tech-minded clients and further cement the trust in their brand while remaining ahead in an emerging digital marketplace.

6.3 Recommendations for future research

With the limitations of this study presently in mind, a few suggestions for future research are warranted. First, a bigger participant group might be desirable, one greater than the 100 participants in this research. A wider sample would allow for greater generalization of findings and permit statistical analyses to adequately power the testing. In this regard, a broadened recruitment basis would entail working with a range of real estate firms, increasing social media outreach, recruiting potential customers estimated to be abroad with rewards, and improving the accessibility of the questionnaire for use by many.

Second, the reliability and internal consistency of the data collection instruments should be improved by a more rigorously tested questionnaire that does not incorporate misleading and ambiguous questions, which has minimal exposure to bias, and utilizes validated measurement scales, such as those offered in standardized Likert items. Also, pilot testing the survey before full circulation may help the researchers identify potential issues before collecting data.

Next, future investigations should find out the socio-cultural and psychological factors underlying the preference to use virtual tools in the real estate operation. That would investigate reasons behind the tendency of certain individuals to prefer a tool over another, or their inclination toward using virtual options instead of being close to a real place. Some of these areas can be explored using a mixed-methods approach: qualitative interviews or focus groups combined with quantitative surveys to delve deeper on the topic.

Lastly, experimental investigations contrasting real estate markets (e.g., emerging and mature, urban and rural) would generate valuable insights and help to determine whether the findings of this study could be generalized or more context dependent.

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Appendices

Appendix 1. Survey

- What is your age group?

- 10-25
- 26-41
- 42-57
- 58-67

- What is your gender?

- Female
- Male
- Prefer not to disclose

- What is your nationality?

- French
- European
- Other

- What is your occupation ?

- student
- employed
- unemployed
- taking care of the house
- other

- Have you ever used 3D virtual reality tour for browsing a property ?

- Yes
- No

- Have you ever used agent video tour for browsing a property ?

- Yes
- No

- How many times did you buy a property in the last ten years?

- None
- One time
- Two times
- Three times

- Four times or more

How would you rate the level of Engagement of 3D virtual reality property searching?

- Disengaging
- Mostly disengaging
- Almost disengaging
- Neither disengaging nor engaging
- Almost engaging
- Mostly engaging
- Engaging

How would you rate the level of Engagement of Agent presented video tour searching?

- Disengaging
- Mostly disengaging
- Almost disengaging
- Neither disengaging nor engaging
- Almost engaging
- Mostly engaging
- Engaging

How would you rate the level of attention-grabbing of 3D virtual reality property in property searching?

- Attention-grabbing
- Mostly attention-grabbing
- Almost attention-grabbing
- Neither attention- grabbing nor unimpressive
- Almost unimpressive
- Mostly unimpressive
- Unimpressive

How would you rate the level of attention-grabbing of Agent presented video tour in property searching?

- Attention-grabbing
- Mostly attention-grabbing
- Almost attention-grabbing
- Neither attention- grabbing nor unimpressive
- Almost unimpressive
- Mostly unimpressive
- Unimpressive

How would you rate the level of usefulness of *3D virtual reality property* property searching?

- Useful
- Mostly useful
- Almost useful
- Neither useful nor useless
- Almost useless
- Mostly useless
- Useless

How would you rate the level of usefulness of Agent presented video tour property searching?

- Useful
- Mostly useful
- Almost useful
- Neither useful nor useless
- Almost useless
- Mostly useless
- Useless

What factors do you think make *3D virtual reality property tours* appealing for real estate? (Select all that apply)

- Ability to explore properties remotely
- Enhanced visualization of properties
- Realistic immersive experience
- Time-saving
- Convenience
- Other (please specify) _____

What factors do you think make Agent presented video tour appealing for real estate? (Select all that apply)

- Ability to explore properties remotely
- Enhanced visualization of properties
- Realistic immersive experience
- Time-saving
- Convenience
- Other (please specify) _____

What potential benefits do you perceive in using *3D virtual reality property tours* for real estate? (Select all that apply)

- Better decision-making process
- Improved understanding of property layout and space

- Reduced need for physical property visits
- Increased access to a wider range of properties
- Higher engagement and interest
- Other (please specify) _____

What potential benefits do you perceive in using Agent presented video tour for real estate? (Select all that apply)

- Better decision-making process
- Improved understanding of property layout and space
- Reduced need for physical property visits
- Increased access to a wider range of properties
- Higher engagement and interest
- Other (please specify) _____

What concerns or barriers, if any, do you have regarding the use of *3D virtual reality tours* for real estate? (Select all that apply)

- Lack of trust in the accuracy of virtual representation
- Limited interaction with the property
- Incompatibility with personal devices
- Potential motion sickness or discomfort
- Other (please specify) _____

What concerns or barriers, if any, do you have regarding the use of Agent presented video tour for real estate? (Select all that apply)

- Lack of trust in the accuracy of virtual representation
- Limited interaction with the property
- Incompatibility with personal devices
- Potential motion sickness or discomfort
- Other (please specify) _____

How would you rate the level of Novelty of *3D virtual reality property* searching?

- Already exists
- Somehow exists
- Almost exists
- Neither exists nor new
- Almost new
- Mostly new
- Brand new

How would you rate the level of Novelty of Agent presented video tour searching?

- Already exists
- Somehow exists
- Almost exists
- Neither exists nor new
- Almost new
- Mostly new
- Brand new

How would you rate the level of Hedonic (enjoyment) of *3D virtual reality* property searching?

- Enjoyable
- Mostly enjoyable
- Almost enjoyable
- Neither enjoyable nor hated

How would you rate the level of Hedonic (enjoyment) of Agent presented video tour property searching?

- Enjoyable
- Mostly enjoyable
- Almost enjoyable
- Neither enjoyable nor hated

- Almost hated
- Mostly hated
- Hated

How would you rate the level of Ergonomy (easyness to use) of *3D virtual reality* in property searching?

- Easy to use
- Mostly easy to use
- Almost easy to use
- Neither easy nor unusable
- Almost unusable
- Mostly unusable
- Unusable

How would you rate the level of Ergonomy (easyness to use) of Agent presented video tour in property searching?

- Easy to use
- Mostly easy to use
- Almost easy to use
- Neither easy nor unusable
- Almost unusable
- Mostly unusable

- Unusable

How would you rate the level of Attractiveness of *3D virtual reality* in property searching?

- Unattractive
- Mostly unattractive
- Almost unattractive
- Neither unattractive nor attractive
- Almost attractive
- Mostly attractive
- Attractive

How would you rate the level of Attractiveness of Agent presented video tour in property searching?

- Unattractive
- Mostly unattractive
- Almost unattractive
- Neither unattractive nor attractive
- Almost attractive
- Mostly attractive
- Attractive

How likely are you to buy a property using a *3D virtual reality* interface?

- Definitely would book
- Probably would book
- Almost would book
- Neither would or would not book
- Almost would not book
- Probably would not book
- Definitely would not book

How likely are you to buy a property using a Agent presented video tour interface?

- Definitely would book
- Probably would book
- Almost would book
- Neither would or would not book
- Almost would not book
- Probably would not book
- Definitely would not book

How likely are you to recommend to your friends and colleagues real estate agencies using *3D virtual reality* Interface?

- Unlikely
- Mostly unlikely
- Almost unlikely
- Neither likely or unlikely
- Almost Likely
- Mostly likely
- Likely

How likely are you to recommend to your friends and colleagues real estate agencies using *Agent presented video tour* Interface?

- Unlikely
- Mostly unlikely
- Almost unlikely
- Neither likely or unlikely
- Almost Likely
- Mostly likely
- Likely

How would you rate the level of Reliability of *3D virtual reality* in property searching?

- Unreliable,
- Mostly unreliable
- Almost unreliable
- Neither unreliable nor reliable
- Almost reliable
- Mostly reliable
- Reliable

How would you rate the level of Reliability of *Agent presented video tour* in property searching?

- Unreliable,
- Mostly unreliable
- Almost unreliable
- Neither unreliable nor reliable
- Almost reliable
- Mostly reliable
- Reliable

How much do you think *3D virtual reality* technology could improve your property searching experience?

- Not at all
- Marginally
- Somewhat
- Moderately
- Significantly
- Very Significantly
- Extremely

How much do you think Agent presented video tour technology could improve your property searching experience?

- Not at all
- Marginally
- Somewhat
- Moderately
- Significantly
- Very Significantly
- Extremely

I would look for real estate agencies using *3D virtual reality* tours to browse through properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I would look for real estate agencies using Agent presented video tour to browse through properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I am willing to use *3D virtual reality* tours to to browse through properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree

- Mostly disagree
- Strongly disagree

I am willing to use Agent presented video tour to to browse through properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I am willing to use *3D virtual reality tours* on a regular basis to browse through properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I am willing to use Agent presented video tour on a regular basis to browse through properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I would recommend others to use *3D virtual reality tours* to browse through properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I would recommend others to use Agent presented video tour to browse through properties.

- Strongly agree
- Mostly Agree
- Almost Agree

- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

If 3D *virtual reality tour* were available I will use them to browse through the properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

If 3D Agent presented video tours were available I will use them to browse through the properties.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I am willing to use 3D *virtual reality tours* to browse through the properties despite it being more time consuming.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I am willing to use Agent presented video tour to browse through the properties despite it being more time consuming.

- Strongly agree
- Mostly Agree
- Almost Agree
- Neither agree or disagree
- Almost disagree
- Mostly disagree
- Strongly disagree

I prefer to use for property searching

- 3D Virtual tours
- Agent presented tours

Why ? Precise your previous answer

Can this Tool replace physical tours ? Why ?