# Proptech: A qualitative analysis of online real estate brokerage agencies in Spain

Juan Carlos Asensio-Soto [iD], Elena Navarro-Astor [iD]

*Universitat Politècnica de València (Spain)*

*juaasso@doctor.upv.es , enavarro@omp.upv.es*

## Abstract

**Purpose:** The arrival of new companies that are more technological and scalable to the real estate sector has caused a revolution in a very conservative and not very innovative industry. The main objective of this research is to characterize the business model of proptech online brokerage companies in home sales in Spain, based on the traditional agency model.

**Design/methodology:** Nine semi-structured interviews were conducted with the CEOs and managers of six proptech online real estate brokerage agencies in Spain. Their content was analyzed by means of the study and comparison of common patterns.

**Findings:** During the digitalization process of the brokerage, a regression was detected back to more classic procedures typically found in traditional agencies, thus establishing an important difference as compared to other more transparent markets. Accordingly, a convergence occurs between the different real estate brokerage models (online and traditional), resulting in a hybrid model.

**Research limitations/implications:** The limited number of agencies that operate in the online mode in Spain makes the sample size quite small.

**Practical implications:** The results contribute greater transparency to a traditional sector characterized by its opacity, and they give visibility to the changes that are currently taking place, facilitating information to both professionals and users.

**Social implications:** It contributes to the fulfillment of sustainable development goal number 9, concerning the promotion of development-oriented policies that support the creation of decent jobs, entrepreneurship, creativity and innovation.

**Originality/value:** It expands the scientific literature dedicated to online real estate brokerage in Spain, given that as of today, we have no knowledge of any other published academic work on this topic. The research contributes to the vision that new sector agents have of it and those changes that are occurring within it.

**Keywords:** Traditional agency, Qualitative research, Digitalization, On-line real estate brokerage, Proptech

**Jel Codes:** M10, M19

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## 1. Introduction

Few companies can escape the digital transformation that is occurring all around the world. Previous research has considered how new on-line platforms manage to connect a buyer and a seller and facilitate the desintermediation of traditional agents in different sectors and contexts (Shaw, 2018; Saiz 2020; Gu & Zhu, 2021; Talmatchi, 2020), and the real state sector is no exception.

The last decade has witnessed significant technological innovations and an important proliferation of new commercial models in the sector (Shaw, 2018; Barwick & Wong, 2019; Clayton et al., 2019; Siniak, Kauko, Shavrov & Marina, 2020). The use of new digital and computer technologies is gradually spreading in a real estate sector marked by its weak capacity to innovate and by its relative slowness to adopt innovative technologies (Kassner, Cajias & Zhu, 2022; Fields, 2019). Furthermore, it maintains a weak transformational position with respect to other sectors (Baum, 2017; Roulac, 2019; Saiz, 2020; Asensio-Soto & Navarro-Astor, 2020).

While it is true that the real estate sector has been slow to incorporate these advances into its business models and research in this area laggs behind (Goodwin & Stetelman, 2013; Fields, 2019; Zhang, Lin, Zhang, Zheng and Zhang (2020), it currently seems to be making up for lost time (Roulac, 2019). This change in the sector is having tangible impacts on different areas, such as the brokerage process with the client, the home search and the creation of on-line platforms (Saiz, 2020). This is how new tech-savvy real estate companies called proptechs have emerged, which over the last few years have revolutionized and significantly changed the sector (Baum, 2017; Shaw, 2018; Roulac 2019; Saull. Baum & Braesemann, 2020).

This being said, we raise different questions:

What are these companies like and how do they work? Are they as revolutionary for the sector as they say? Is the traditional real estate agency doomed to disappear?

In an attempt to answer these questions, the main objective of this research is to characterize the business model of the proptech online brokerage companies in home sales in Spain, based on the traditional agency model. In pursuit of this goal, the following secondary objectives were also considered:

- Profiling the traditional agency business model.
- Identifying on-line brokerage proptech companies and analyzing their business model.
- Describing the different existing business models in real estate brokerage.

The usefulness of this work lies in facilitating the comprehension of the changes that are currently occurring in a sector marked by its opacity and lack of transparency.

## 2. Theoretical framework

### 2.1. Proptech: The concept and evolution

The term, formed from the words "property" and "technology", describes companies whose business models link technological and innovative possibilities with the real estate sector (Catella, 2016; Shaw, 2018; Friedman, 2020; Hernández, Puigdevall & López Gustavo, 2021). Baum, Saull and Braesemann (2020, p. 5) define it as "the digital transformation which is taking place in the real estate industry". For Saull et al. (2020), it is a movement that promotes a change in mentality within the sector and its consumers. Siniak et al. (2020) define proptech as the massive implementation of emergent technology in the real estate sector.

Proptech is the most commonly used expression, but there are other terms such as *cretech* (Putzier, 2016), *realtech* (Baum, 2017; Maarbani, 2017) and *platform real estate* (Shaw, 2018). Fields and Rogers (2019) also use the term *platform real estate* to refer to commercial platforms used to buy and sell properties that connect owners with clients. In this work, the term proptech is used to designate the group of new technological real estate companies, as it is the most commonly used in the academic literature.

Some proptech success stories that have been widely publicized are the online real estate databases or marketplaces, such as Zillow in the United States, Idealista and Fotocasa in Spain, and the new online brokerage

agencies, such as Purplebricks in the United Kingdom (Goodchild & Ferrari, 2021) and Housfy and Housell in Spain (González, 2017; Friedman, 2020).

Hernández et al. (2021) point to the year 2000 as the origin of the proptech concept, although Baum (2017) identifies 3 stages to explain its evolution. The first wave (proptech 1.0) emerged primarily in the United States and the United Kingdom in the mid 1980s, with the personal computer being the key driver of the change. Spreadsheets become the platforms for the organization and analysis of data, impacting the real estate practice (Baum, 2017; Baum et al., 2020).

Proptech 2.0 began in the 2000s, when technology emerged in the traditional real estate sector, creating process efficiencies through automation, scale and uniformity (Baum, 2017; Baum et al. 2020). Data analysis and the beginning of virtual reality offered better and more specialized services (Siniak et al., 2020), in addition to optimizing consumer experiences, inspiring new agents and other more consolidated ones to invest in their development (Blair Equity Research, 2015).

It was in this stage when new companies were founded, focused on the buying and selling of property online (Baum et al. 2020; Siniak et al., 2020; Baum, 2017), such as Idealista and Fotocasa in Spain (González, 2017), Rightmove in the United Kingdom and peer-to-peer platforms like Airbnb and Homeaway (Hernández et al., 2021). This phase is associated with important and revolutionary innovation and a significant increase in investments.

Finally, proptech 3.0 sees the development and evolution of emergent technology, such as blockchain, big data and artificial intelligence (Baum, 2017; Baum et al. 2020) and experimentation with drones, virtual reality tools and the Internet of things (Siniak et al., 2020).

This evolution also manifests itself at the investment level (Kassner et al., 2022; Baum, 2017; Shaw, 2018). The overall financing of venture capital in real estate technology companies has grown substantially in recent years, achieving a compound annual growth rate of 63% between 2012 and 2017, amounting to €10,000 millions in 2017 (Ivens & Barbiroglio, 2018). The estimated value of the Unissu proptech platform for 2018 was a little over €13.2 billion (Baum et al., 2020).

## 2.2. Overview of the characteristics of the traditional agency

In traditional real estate brokerage, the physical environment plays a crucial role in the definition of a distinctive value proposal, constituting a tangible indicator of the quality perceived by the client (Mencarelli, 2005). Vargo and Lusch (2004) add that one of the key elements offered by the physical space is the experience of the client, who perceives a sensation of co-production and co-creation of the service itself. For Gardès (2019), providing a welcoming, modern, transparent and open physical environment is a source of hedonic value. The agency as a vital space must help by being an aesthetic experience that facilitates the act of acquiring a real estate service through the pleasure that it offers to the client.

The real estate agent has been critically reviewed by a large number of scholars (Benefield, Sirmans & Sirmans, 2019; Larceneux, Lefebvre & Simon, 2015; Bernheim & Meer, 2013; Levitt & Syverson, 2008). Their functions are primarily that of a broker between the buyer and seller, providing constructive solutions (Barresi 1968; Iazzi & Trio 2016), offering market information and improving communication between the seller and the buyer. (Larceneux et al. 2015, Bernheim & Meer, 2013). With regard to this communication, Clotet and Gallardo (2018) state that it is impossible for the real estate agent to intermediate in a totally independent and impartial way, and at the same time effectively. This is because the supply of housing and the interest in buying a home have conflicting interests.

Adams (2020) highlights the importance of the type of asset that is exchanged, which is such that the client is still required to have close personal contact with the real estate agent in order to obtain greater guidance when it comes time to make this important decision. Palm and Bolsen (2022) and Zhang et al. (2020), add that housing is an expensive consumer good, and the buying process for it is complex and not usually repeated over the short term. It involves a long-term investment decision, with high financial risks and, in many cases, with a great lifelong impact on buyers. Therefore, it requires more procedures, additional time for reflection and energy on the part of buyers.

On the other hand, in the most advanced countries, real estate agents do not enjoy a good reputation, due mainly to the high commissions they charge (Talmatchi, 2020). The lack of regulation regarding these commissions results in different forms of compensation that range from a fixed compensation to a sliding scale based on the sale price (Rodríguez Ruiz de Villa, 2005). Caballé (2021) indicates that in Spain, real estate brokers have total freedom to set their fees, as well as to decide whether they are reflected as a percentage of commission or a fixed price.

The level of agent qualification has also been questioned for years. Filstad and Gottschalk (2009) indicate that professionalism is not only an academic title, but also includes honesty and knowledge. For Clotet and Gallardo (2018) and Roulac (2019), real estate brokerage will be viewed with suspicion as long as the sector is dominated by people with inadequate qualifications and training. The emergence of new, more technological models in the real estate sector, as well as their digitalization and transformation, can also mean the search for and recruitment of more qualified professionals from other sectors (Roulac, 2019; Lafuente Pastor, 2019).

## 2.3. The classification of proptechs in Spain

It is not easy to establish the exact number of proptech companies operating in the market. According to the Unissu platform, in 2019 a total of 3,219 proptech companies were registered in Europe, with eight countries having 100 or more proptechs, and the United Kingdom being the country with greatest number (805) and Spain in fourth position, with 304 companies. On the other hand, the consulting firm Finnovating counted 253 proptechs in Spain in 2018 (Asensio-Soto & Navarro-Astor, 2019), and 359 in April 2021.

More than 90% of all proptech companies around the world are small and medium-sized companies (Kassner et al., 2022). In the case of Spain, the average profile corresponds to a start-up founded after 2010, with a staff of between 1 and 10 employees, of which 76% are men, and with a home office mainly in Madrid or Barcelona. The most common type of business is the service related to the buying and selling or renting of houses (Finnovating, 2018).

The classification of the different proptech verticals (Table 1) is not a simple task, since there is no defined consensus for this. The most common methodology employed uses as a reference the technology utilized by the companies (Hernández et al., 2021) and the services they offer (González, 2017). This pattern coincides with that found throughout Europe, in such a way that the majority of the proptech maps use very similar categories (Hernández et al., 2021).

| No. of verticals | Mapaproptech.com | Finnovating |
|---|---|---|
| 1 | Marketplaces | Marketplaces |
| 2 | Big Data | Big Data |
| 3 | Investment | Investment |
| 4 | Software | Software |
| 5 | Financing | Financing |
| 6 | Property management | Property management |
| 7 | Image | Visual Startups |
| 8 | Peer-to-peer | Peer-to-peer |
| 9 | Internet of things | Smart home |
| 10 | Marketing | Marketing |
| 11 | | Contech |

Note: Grouping of companies in a category that serve a specific niche or market.

Table 1. Number of proptech verticals in Spain. (Mapaproptech.com & Finnovating)

In 2017, the first online proptechs appear that are classified in the peer-to-peer vertical, indicating a turning point in real estate brokerage in Spain. Inspired by the British proptech Purplebricks, they promote a new business model that causes a major upheaval in the more traditional brokerage companies and a noticeable impact on the market. Originally, their intention was to facilitate the contact between buyers and sellers, with the objectives of reducing costs and improving the experience, providing added value to the use of the platform (Hernández et al., 2021).

## 3. Methodology

This research follows a qualitative exploratory approach, which helps to delve deeper into specific cases and not to generalize, describing the social phenomenon based on the characteristics studied (Bonilla & Rodríguez, 2005). The interpretation, and therefore, the relationship between theory and research, is open and interactive (Corbetta, 2007). The exploratory research strategy was chosen because this study had the objective of finding out information about an unknown phenomenon without any hypotheses (Lazar, Feng & Hochheiser, 2017).

### 3.1. The study population and sample

Total number of the agencies categorized as proptechs in Spain is in continuous evolution. There is no uniformity of the data, and consequently their number is estimated to range from 300 to 350, depending on the proptech map consulted (Finnovating, 2021; Hernández et al., 2021). To define the survey population, each of the proptechs defined within the different verticals (see Table 1) was reviewed and categorized whose corporate purpose was the online home buying and selling. These verticals are provided by two of the main proptech map classification companies in Spain (Finnovating, 2021; Hernández et al., 2021).

Once analyzed, it was decided to include six proptechs in this study. Eight belong to the peer-to-peer vertical, originally established according to an online model that remains in effect to this day, and they are dedicated to real estate brokerage in Spain. The rest perform other functions that fall outside the scope of this study, such as home rental or parking lots.

Exceptionally, Prontopiso was included in this study, even though it is classified in the investment vertical. The reason for this is their online brokerage model in the buying and selling of homes, which meets the requirements for the sample being studied. This company does not belong to the peer-to-peer vertical, due to the lack of direct contact between individuals in its real estate management, or in other words, because of the presence of an intermediary between the parties.

The sample selection was carried out by means of a discretional or judgment sample. The selection of each sample unit is based solely on conceptual criteria and according to structural representativeness. That is to say, "the variables that define the composition of the sample structure are theoretically defined by the researcher" (Mejía, 2000, p. 169).

The sample comprises nine real estate-sector professionals from six on-line proptech real estate brokerage agencies in Spain. All those interviewed were men; six were CEOs, one was a communications manager, another was an operations director and another was the main investor and founder of one of the proptechs (see Tables 2 and 3).

| Participant | Position | Gender | Qualification |
|---|---|---|---|
| Participant 1 | CEO | Male | Civil engineering<br>MBA |
| Participant 2 | CEO | Male | Business administration<br>MBA |
| Participant 3 | CEO | Male | Computer engineering |
| Participant 4 | CEO | Male | Marketing and economics<br>Master's degree in marketing |
| Participant 5 | CEO | Male | Law<br>Various courses and specialization master's degree |
| Participant 6 | Communications director | Male | Journalism<br>Master's degree in digital marketing |
| Participant 7 | Co-founder | Male | Various master's degrees in Senior business management, multimedia and telecommunications |
| Participant 8 | CEO | Male | Industrial Engineering |
| Participant 9 | Operations director | Male | IT<br>Master's degree in project management and administration |

Table 2. Description of the participants

| Agency | Number of interviews | Participant | Mode |
|---|---|---|---|
| Deplace | 1 | Participant 1 | Video call |
| Prontopiso | 2 | Participants 2 and 5 | Video call |
| Housell | 1 | Participant 3 | Video call |
| Propertista | 1 | Participant 4 | Video call |
| Housfy | 2 | Participants 6 and 7 | Video call |
| Holpper | 2 | Participants 8 and 9 | Face to face |

Table 3. Agencies participating in the research and interview type

The participants from each agency were recommended by the agency after the initial contact, which occurred in one of two ways. The first was through a search and initial contact via LinkedIn or Facebook and the subsequent exchange of emails, and the other was through a message sent directly to the email address provided by the website of each proptech, indicating the research objective.

Prior to the interviews, the participants were informed about the research objective and asked whether they gave permission for the voice recording of the interview. It was explained to them how the data would be stored and processed. In addition, they were told that the data would be used exclusively for research purposes.

### 3.2. Data collection and analysis procedures

Among the qualitative research strategies that exist for data collection, we opted for interviews, "the objective of which is to obtain data by questioning people, but with the typical purpose of qualitative research, which is to delve into the individuality of the person interviewed and see the world through their eyes" (Corbetta, 2007, p. 229). The interview is therefore "a conversational narration, jointly created by the interviewer and the interviewee" which forms a structure that serves as the subject matter of the study (Grele, 1990, p. 112).

For the purposes of stimulating responses that would provide new information on the study objective and give greater freedom to the interviewee (Flick, 2007), semi-structured questions were proposed (Caven, 2012; Ozols & Fortune, 2012; Hodgson, Paton & Muzio, 2015). Furthermore, prior to the final interviews, a pilot test was conducted that revealed different aspects for improvement: the reformulation of questions that led to yes or no answers so that they had a more qualitative format, and the possibility of generating new questions, serving as the basis for refining the final script (Howell & Lang, 2017).

Here, we delve deeper into the following aspects of the interview script: qualification and training, self-definition of the proptech studied, the method used to collect fees, the importance of a physical office in terms of customer service and the figure of the brokerage agent.

Although it was initially planned to conduct the interviews face to face, precautions were taken as the result of the COVID-19 outbreak, and all but the last interviews were conducted by video call (see Table 3). The face-to-face interview was held at the participant's workplace. They were carried out between November 2020 and March 2022, and had a duration of between 60 and 90 minutes. The interviews were recorded in audio format for subsequent literal transcription, resulting in a text document. A total of 55,000 words and 600 minutes of audio were recorded.

The information has been analyzed by means of the creation and synthesis of different categories and their comparison, in order to obtain the most complete vision possible of the subject matter of the study. The Excel program was used to create a data table for each interview and for each concept being studied, facilitating the comparison among the characteristics studied. The analysis of responses has made it possible to identify patterns common to each participant in terms of the proposed topics. The data in this study were dealt with by means of inductive reasoning (Leavy, 2014), as the aim of this work was to provide knowledge within such a limited research area as the influence of proptechs in home brokerage.

According to the thematic analysis and interpretative research, the findings are presented below and are backed by selected quotes from the narratives of those interviewed (Clandinin & Connelly, 2000). We wanted the results to capture all the richness of the information contained in the interviews to enable readers to draw their own conclusions about the accuracy of our interpretations regarding the topics considered. However, the truth is that

it is impossible to transfer everything said by the participants to this document. Instead, the main topics are presented that arise from the data, using quotes that reference the interviewee. This is a well-established practice in narrative-based research reports (Leavy, 2014).

## 4. Results and discussion

The points analyzed address the qualification of the CEOs, how they define their business model, the usefulness of a physical office and the participation of the real estate agent. All of this describes and characterizes the different brokerage models that exist.

### 4.1. CEO qualifications

As seen in Table 2, the academic training of those interviewed is especially relevant, with all having advanced qualifications and most with a master's degree.

On the one hand, this reality contrasts with the works that indicate that the traditional real estate sector is led by persons with inadequate knowledge and skills (Clotet & Gallardo, 2018; Roulac, 2019). On the other hand, it confirms the findings by Roulac (2019), who indicates that the appearance of new business models in the real estate sector with a higher technological and digital level could lead to the need to hire new, more qualified professionals and those by Pedreño (2017), who highlights talent attraction/recruitment by the proptech agencies.

### 4.2. How they define themselves

When the participants were asked about the definition of their real estate business model, many coincided in pointing to the British proptech Purplebricks as a reference, both as a starting point and the origin of their own particular idea of an online agency. The following excerpts show how they saw in the Purplebricks model a window of opportunity in Spain, analyzing and emulating it:

> "*The first one we set up was Housfy, which came about after having seen that there was an English company called Purplebricks, which was functioning very well and that in Spain there was nobody who was doing the same thing and doing it well. We have the model, we could call it a model of observation, research and copying.*" Participant 6, Housfy.

> "*One day I had this inspiration because on a trip I took to London, I was sitting in the hotel room, I remember, the television was on and there was a Purplebricks commercial. It is a proptech in England that has been very successful, it is traded on the alternative stock market in London, and well, you know these things, 300 employees. And basically it was advertised like this: "Digital real estate agency. You sell your flat without paying real estate agency commissions, for a set price of 895 pounds; it was the time.*" Participant 4, Propertista.

Confirming this result, Goodchild and Ferrari (2021) identify Purplebricks as one of the success stories within the new online brokerage agencies and Hernández et al. (2021) also point out the importance it has as a source of inspiration, prompting and inciting the new online model in Spain.

And how does each participant define their real estate agency? On the one hand, Housell and Prontopiso are considered to be "hybrid agencies" or agencies with a "hybrid vision, both digital and on-site." This refers to the combination of the online agency model with the traditional model, identifying the latter with the participation of the sales agent in the brokerage and accompanying the client on the visits:

> "*I really think that the model that is going to work is going to be a hybrid model; it's going to have to be a hybrid model on all levels, in other words, (…) surely it will be based on transactions, but I can't see a 100% digital model.*" Participant 2, Prontopiso.

On the other hand, the participants from Deplace, Propertista and Housfy highlight their more digital and online side, therefore distancing themselves from the classic agencies, while not always 100%:

> "*In the end, we are like a technology that is trying to replace the real estate agent, digitalizing him or her; you're really not the owner of anything; you're simply an SAAS (Software as a service) (…) It's a website that is in a cloud, operating with what you are inputting into it, a series of things, and you work with it and you pay a monthly fee*". Participant 1, Deplace.

*"It's true that right now, Housfy would not be considered a 100% digital service, it would be a 90% digital service (…) because users are still not ready".* Participant 7, Housfy.

*"I've taken the British model and I've brought it to Spain, the pure [model]."* Participant 4, Propertista.

### 4.3. Fees

The emergence of these companies, more scalable and with the capacity to streamline processes and cut costs (Baum, 2017; Hernández et al., 2021), has also meant a change in paradigm with regard to the charging of fees, in terms of both when and how they are collected (Table 6), and the costs that are passed on to the client. These changes confirm what has been stated by Rodríguez Ruiz de Villa (2005) and Caballé (2021), when they add that in Spain, the agents have the freedom to decide whether to charge a percentage commission or a set price, as well as its amount.

Housell and Propertista propose a ground-breaking change in the sector, where it was normal to pay upon the successful completion of a sale, by charging the seller in advance. The rest maintain the format of the traditional agencies.

One of the CEOs explains the different methods that exist in the real estate market when it comes to paying fees:

*"There are only 3 models, paying in advance, which it's just us in the market (Propertista does this too), that where you pay a flat fee upon the successful sale, for which there are several cool proptechs that do things very well, but there are very few, let's say 3, 4 or 5, and then there is the vast majority of real estate agencies that charge a fee upon the successful completion of the sale, but it is a percentage, and also with a minimum amount."* Participant 3, Housell.

Table 4 identifies the 3 models described by Participant 3 (Housell). According to this classification, Deplace, Housfy and Holpper would belong to the model that requires the payment of a fixed amount upon the successful completion of a sale (model 1); Propertista and Housell belong to the advanced payment model, requiring a flat fee (model 2) and Prontopiso would be identified with the more traditional model, which charges a percentage upon a successful sale (model 3). Of the three models, there is little doubt that the one represented by Housell and Propertista is the most revolutionary as compared to the more traditional model in Spain. It breaks the normal rules under which traditional real estate agencies have operated: the service is provided and they are only paid if the property sale is finalized. Similarly, this charge would be a stipulated percentage of the sale value.

|  | Model | When fees are charged | How fees are charged |
|---|---|---|---|
| **Deplace** | 1 | Upon successful completion of the sale | Set commission |
| **Housfy** | 1 | Upon successful completion of the sale | Set commission |
| **Holpper** | 1 | Upon successful completion of the sale | Set commission |
| **Housell** | 2 | In advance | Set commission |
| **Propertista** | 2 | In advance | Set commission |
| **Prontopiso** | 3 | Upon successful completion of the sale | Percentage |

Table 4. Online proptech fee model for home brokerage

Participant 1 (Deplace) justifies the model that charges fees upon the successful completion of the sale over the customary pay-in-advance method that is so deeply rooted in consumers:

*"Then there are people who prefer to charge in advance, because I think that you are being given access to a program. How you use it is up to you, and we think that in a market where everyone is used to paying upon completion of the sale, it makes sense, in the end, to complete the transaction and that's why we've opted for this model".*

In the same way, Participant 6 (Holpper) clearly states that the advanced payment option, the model used by Propertista and Housell, is not a viable model these days in a Latin market, which is very different from the Anglo-Saxon market:

> *"Housell has a model that we consider unacceptable to Latin people, they can't get their heads around it. It's a model copied from England, from Purplebricks, the same thing, and Propertista does the same, right? It's that, Latinos just can't conceive of it these days. I don't know about in a few years, but as of today… The whole thing that I pay you something and you still haven't sold my house, even if it's €300 euros… Photos? I'll take them myself. My wife takes better photos than you (…) Just because it has worked in England doesn't mean that it will necessarily work here."*

The difficulty expressed by the above participants regarding advance payment is also reflected in the following statements:

> *"They have to pay for my service in advance, and this has been the biggest problem we've had when it comes to being able to increase the sales level, because a lot of people… are very used to the model in Spain, because that's the way it's always been done, paying when the flat is sold. But this paradigm is a bit of a challenge for us."* Participant 4, Propertista.

> *"That people would want to sell more digitally favors us, but as an "outlet", it doesn't favor us that people's purchasing power goes down, because then, having to pay in advance, it backs them into a corner and they say: "What the hell! I have to pay in advance? No way! The current situation the way it is, I'm not sure if I am going to sell or what the price is." So many prefer to go with the traditional model."* Participant 3, Housell

With regard to whether the fees are fixed or a percentage, all the agencies interviewed, except Prontopiso, charge a flat rate. They defend their position as being more transparent, cheaper for the client and more efficient, while they mark a difference between the concept of fees and commissions. This change in the model can be the result of trying to differentiate themselves from the poor image that the traditional real estate brokerage had, related to the high amounts charged by way of commissions, which is also alleged by Talmatchi (2020).

> *"Those of us who charge a flat rate, it's not the same, a commission is a percentage. So they (referring to traditional agencies), by charging a 5% commission, what happens is that the real estate agent has a conflict of interest with the sales price. What does that mean? That I want to sell it for more in order to earn more, so they work with 9-month sales times, because they are trying to inflate the price even more. In this sense, the Housfy model is more efficient because there are set fees."* Participant 6, Housfy.

## 4.4. Physical office

The decision whether to open a physical store front office for customer service as a point of sale for real estate is possibly one of the characteristics that most marks the difference between the online and traditional models. If for Gardès (2019) there is an important debate about this topic, all the participants share a common vision about its use: they believe that it is not useful and that it involves excess costs. This would go against what was stated by Mencarelli (2005), who perceives an element of value in having an office.

> *"It seems to me that opening an office does not make any sense these days. I see myself then as a sort of an online travel agency in some ways, okay? I mean in that sense, I jump to the online."* Participant 5, Prontopiso.

> *"Here (referring to the office where the interview took place) no clients come in because you see that there are no pictures of homes on the posters, so… if someone comes to the door, we let them in, but this is it, there are no more offices."* Participant 8, Holpper.

> *"No, because it deviates from the cost structure and in the end, we operate nationally; we're not an agency like Gilmar, an agency that is in Madrid and that's it, or Madrid and Cádiz. It has 36 agencies in Madrid, while we operate on a national level; we would have to open 500 franchises or 500 agencies, you see?"* Participant 3, Housell.

The lack of offices means a change in the real estate agency model and an important adaptation on the part of the client, who is very used to being assisted in a physical environment, and who must now operate and communicate via an online platform. Some interviews brought up the difficulties that they find with this new way of operating:

*"The online model doesn't have an open office, and so it takes you longer to win their trust or it is more difficult to win a person's trust of a person because they cannot go to a shop and touch the agent."* Participant 1, Deplace.

Possibly because the client is not used to it, or the need to publicize yourself by means of a more tangible system has led some online proptechs to open up their offices every so often.

*"When we got started, we did have to sign contracts sometimes in the office, although our office wasn't set up to serve customers."* Participant 6, Housfy.

It also reformulates its strategy, devising the opening of physical spaces, but by means of a model that is different from the one that is currently known, and more inspired by more technological sectors, like the Apple Store. It is a place where clients are assisted in a more experiential manner and where the online model can be publicized from a more classical perspective, in other words, getting physically close to potential clients.

*"We're going to announce it soon, but I can talk to you about it already. The thing is that we also want to reinvent the store front office, inspired a bit by the Apple Store model."* Participant 6, Housfy.

*"The street agencies are going to disappear. In other words, one thing is that you have a sort of "flagship" store and another is that you have two or three points wherever you might have it."* Participant 5, Prontopiso.

This concept is very close to that suggested by Clayton et al. (2019) when he refers to the office as an environment more adaptable to today's times, in which new social connections are established between the provider and the client. Gardès (2019) also supports the idea of reconfiguring the concept of the office, providing a new meaning to its original function.

## 4.5. The figure of the real estate agent

For each of the participants, this is a very important figure; what changes among the models is the way in which their functions are understood. Their on-site presence, both at visits to the home and in meetings with buyers and sellers, is an element that sets them apart from the rest. This figure is thus perceived from two different perspectives.

On the one hand there is the perspective of the agencies that are defined as hybrid (Prontopiso, Housell and Holpper), which believe that the agent is key in a type of operation as reflective as the buying or selling of property. Numerous authors maintain this point of view and point to the functions performed by the agent as being very important, since they support the buyer and seller throughout the entire operation (Barresi, 1968; Iazzi & Trio, 2016; Zhang et al., 2020; Palm & Bolsen, 2022). However, with the arrival of technology to the sector, other researchers question their usefulness (Baum, 2017; McLaughlin, 2018; Talmatchi, 2020).

*"At some point in time, a physical visit is necessary. (…) We opt for quality brokerage that really makes sense within the operation and then for it to also have a good technological layer, okay? In other words, that the agent is really the agent of the future (…) What we're looking for is to digitally empower the real estate agent."* Participant 2, Prontopiso.

*"There are 100 of us on the street who are real estate experts, who have experience in the sector, having worked in real estate agencies, and who love the digital world. There might be a proptech that is 100% online if you want to call it that, but in proptech, technology is not always linked to no physical contact, and even more so for a sale as reflective as the sale of a house."* Participant 3, Housell.

And on the other hand we have the more digital agencies (Deplace, Housfy and Propertista), who see the on-site agent as a "totally unnecessary" element or one that is "unnecessary for most operations" and which "requires time and money":

*"This figure* (the in person agent) *seems entirely unnecessary to us; they require time and money, because in the end, the person's travel and the hours that they are there is money. Since every time you open up a house and you don't sell it, and you need to repeat this process many times, it is a lot of money that you are throwing away. If we cut out this process, we can give back a large amount of savings to the owner and give them only what really has value for them, which is getting clients and making a contract that won't cause them any problems."* Participant 1, Deplace.

*"Real estate agents, if I remember correctly, each sell approximately 6, 10 or 12 homes on average per year, which would be an average of half a home or a home every month, right? Normal agents eh… there are a lot of pirates out there, a lot of freelancers who sell 2 houses a year, right, this includes all of them, so the figure might be a little adulterated, perhaps. Our agents* (referring to online sales representatives) *sell an average of around 150 per year."* Participant 6, Housfy.

*"Essentially, it's useless* (the figure of an agent)*, in the sense that what the owner needs are those services that we offer, and what they don't need is the snow job of a gentleman who comes to your house, who talks to you, who tries to sell you the moon, who wants to lower the price so that he can earn the commission."* Participant 4, Propertista.

These agencies defend the position that a direct, trusting relationship between buyer and seller favors greater transparency and prevents the possible conflict of interests that occurs when the agent represents both parties. This theory is also supported by Clotet and Gallardo (2018), who state that it is impossible to perform the brokerage services in an impartial manner.

*"What we wanted there was to be the alternative that is putting the seller in contact with the buyer, a bit for the reason of having transparency and avoiding this conflict of interest."* Participant 3, Housell.

*"We don't do the negotiating. The truth is that we let our platform do it transparently. I don't want you to tell me one thing and then I have to tell the other person something else."* Participant 2, Propertista.

At the same time that they renounce the physical presence of a real estate agent, at least in their original ideology, in which they only offered the peer-to-peer mode, online agencies (some more than others) have begun to offer their services by means of a supplementary fee, justifying it in the following manner:

*"…[It is] very optimal or necessary* (referring to the presence of the agent) *in cases of high-priced homes and added value and superfluous in the case of cheap flats, where there is technology to… for example, Housfy."* Participant 7, Housfy.

*"At the moment we offer it as an extra service in the real estate branch and this, the visits, (…) We have a network of real estate agents who are freelancers, in Madrid and Barcelona, not very big (…) there are not many people who request this service, but the truth is that 5% of the clients do request it. Although now, if I remember correctly, we offer it only in Barcelona and Madrid. (…), but in the end, it didn't really fit in much with our vision, but the truth is that it is there."* Participant 6, Housfy.

*"We've considered, and probably at some point we'll do it, having agents to complete the service for people who say, [it's] my second residence, they can't do visits and such. It's a new model that we are very probably going to implement, having regional agents."* Participant 2, Propertista.

This is also the case of agencies like Housell, that originally only offered the *peer to peer* service but currently is defined as a hybrid agency, as it incorporates the presence of the real estate agent as a fundamental part of its business model:

*"There might be a proptech that is 100% online if you want to call it that, but in proptech, technology is not always linked to no physical contact, and even more so for a sale as reflective as the sale of a house. No, no, for me it's not a situation of one or the other. I mean, proptech can have technology for one thing and need a lot of physical presence for another. It's a proposal of ours that we think we need physical presence for very important times in the sales process."* Participant 3, Housell.

The majority of proptech agencies provide the support and brokerage service by an agent under certain circumstances, according to Palm and Bolsen (2022), Adams (2020) and Zhang et al. (2020). These authors defend the stance that there are variables, such as the importance of the type of good being exchanged, its high price, the low level of sales repetition and the complexity of the processes, that prevent brokers from being easily replaced, as occurs in other markets. For example, we see total desintermediation in the rental market with companies like Airbnb, the sale of books with Amazon (Zhang et al., 2020), and flight and hotel reservations that are made entirely online (Palm & Bolsen, 2022).

## 4.6. Home brokerage business models

Figure 2 lists the different proptechs studied according to whether or not they had the following characteristics: online platform for formalities and to offer their services, direct contact between parties (buyer and seller), the figure of the real estate agent physically present as a broker between the private parties and finally, the customer service office.
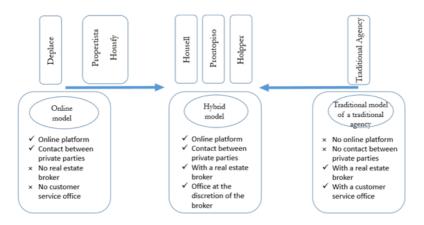


Figure 2. Models of real estate brokerage in Spain

According to these characteristics and the opinions of the participants, a third brokerage model can be identified, the hybrid model, which would include the Housell, Prontopiso and Holpper companies. These are agencies created as an online real estate platform, and therefore they do not have a traditional customer service office, but at the same time, they do make use of the presence of the real estate agent for support during visits (classic element). Of the three, only Housell also offers the option of direct contact for the buyer and seller. The hybrid agencies argue that their model is better adapted to the current customer needs, offering on the one hand the proximity of physical contact, and on the other, the transparency and agility provided by the use of technology:

> *"I really think that the model that is going to work is going to be a hybrid model; it's going to have to be a hybrid model on all levels, in other words, (…) surely it will be based on transactions, but I can't see a 100% digital model, I mean, I don't think that it is going to become "mainstream"."* Participant 2, Prontopiso.

> *"Because the process is more accessible, because the process is more transparent, because it saves me money, but the essence is how technology can help the end client, which for me is key."* Participant 3, Housell

Within the online brokerage mode are Deplace, Propertista and Housfy. It is true that Housfy and Propertista would not be 100% online according to the characteristics established for this classification, because they have been converging and incorporating the service providing physical support and the consultancy of a real estate agent pursuant to the payment of a supplemental fee. Accordingly, Deplace will be the only online agency as of today that maintain its fully peer-to-peer activity.

Regarding the model:

> *"We are like a large agency, a large agency in the center of Madrid or a large agency in the center of Barcelona; it's just that we're in the center of the Internet, so to speak, and we help you to sell".* Participant 1, Deplace.

> *"Thus by having a more scalable model, we can then afford go to for volume. Of course, we have optimized all our services very well."* Participant 6, Housfy.

> *"Another main difference with the majority of the proptechs is that to have a scale economy and be cheap, the visit is conducted by the owner, and this is also good; it depends on how you look at it."* Participant 4, Propertista.

Figure 3 also shows the unique features identified for each proptech, based on two variables, the extent to which on-line platforms are used as a brokerage tool and the participation (or non-participation) of the agent in providing support for clients during visits.

> *"That is why I say that for me, the future is the hybrid models (…) The traditional ones are going to transition into digital ones and the proptechs will have processes, value chain activities, which I insist, I find difficult to digitalize."* Participant 2, Prontopiso.

> *"I see a convergence of digital agencies towards…traditional, towards our more digital model; so, traditional agencies move a little towards the digital ones and I think that in 10 years it will be a bit like that. Surely those real estate companies that not move closer to us will disappear."* Participant 4, Propertista.
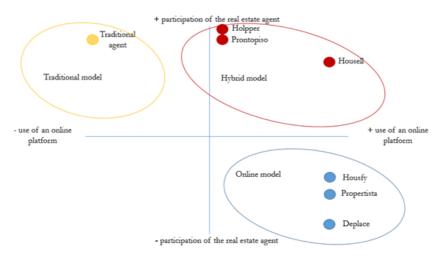


Figure 3. Typologies of brokerage models

## 5. Conclusions

Through an exploratory methodological perspective, this work identifies the main online home brokerage companies in Spain and determines their characteristics. In addition, on the basis of the traditional agency model, different real estate brokerage typologies are described as they are found in the sector. In this way, new knowledge is contributed to the scarce amount of existing literature, which might serve as a basis for future research.

The results of this study allow for the following conclusions to be drawn:

Even though it can be observed that in real estate brokerage, like in most sectors, a revolutionary process of digitalization is taking place, a differentiating process is also perceived. A divergent situation is occurring in the housing market, since the desintermediation has not clearly materialized and it is facing some very special circumstances. Although initially two clearly distinct models of brokerage can be identified (traditional and on-line), the existence of a third hybrid model has been demonstrated. This model emerged from the convergence of agencies with an online model towards those with characteristics more commonly associated with traditional agencies, such as the real estate agent, who accompanies and assists the clients on certain types of visits. Likewise, although with a different vision from the traditional agency, physical offices are introduced to make the services available to the client in a way that is up close and personal. The acceptance of premises previously rejected by some online proptechs, such as the figure of the agent and physical space, show the complexity of a sector that remains very rooted in certain customs.

Thus a certain regression seems to be occurring in the digitalization of real estate home brokerage toward the more classic procedures of traditional agencies. This establishes an important difference from other transparent markets of basic consumer goods, where buyers can access to the product and market information in real time and make immediate exchanges.

The emergence of new online brokerage agencies come hand in hand with highly-qualified entrepreneurs who contribute talent, training and experience, which constitutes a new barrier for entering a sector characterized by their absence.

The new on-line agencies have also provided a change in paradigm for the brokerage sector in terms of fee collection, incorporating new options. These include payment in advance as opposed to the traditional model of paying upon the completion of a successful sale, and the emergence of the term "fees" as a synonym to a preset fixed amount, instead of a commission consisting of a certain percentage of the final sale. This involves not only a differentiation in the payment itself, but also a more professional company model that online proptechs want to present to clients.

The brokerage proptechs, due to their on-line nature, are recipients of a large amount of data, which sets them apart from the traditional model. The use of these data, carefully analyzed, can give them a very important competitive advantage in the future over traditional agencies. Therefore, these proptechs will probably be boosted by the development of technologies such as big data, artificial intelligence and blockchain.

These new agencies have the potential to increase market transparency, creating a greater level of confidence in the users, making process more efficient and generating economies of scale, reducing transaction costs and increasing profits. But in order to survive, they will need to adapt their services to a market that requires a certain amount of face-to-face contact, due to very characteristics of the good being exchanged. On the other hand, traditional agencies that refuse to start a digitalization and modernization process will run a serious risk of disappearing.

Finally, the peer-to-peer vertical in which most of the proptechs studied are classified, and the investment vertical in which Prontopiso (Hernández et al., 2021; Finnovating, 2021) is classified, do not match the activity that these agencies currently perform. Thus, it would be recommendable on the one hand, to review and update the verticals and the companies belonging to them, and on the other, to incorporate a new vertical whose main topic is brokerage, which more closely resembles their business characteristics, and in which all of the companies studied would fit. The name "brokerage" or "brokerage platforms" is recommended, moving closer to the concept of *platform real estate* as described by Shaw (2018).

## 6. Limitations and future lines of research

The limited number of agencies that operate in the online mode limits the sample size. The context of the pandemic did not allow for conducting most of the interviews in person, which would have possibly enriched the results obtained in terms of nuances and information.

The results of this study open up new avenues for research. It is recommended to continue to explore the convergence process of the agencies belonging to the different models, as well as to delve deeper into the technology tools that encourage data collection, analysis and use, and analyzing whether this leads to greater efficiency in management of clients and the resources used. Finally, it would be of great value to investigate clients and study how they assess their experience with these online agencies. By focusing on their problems and needs, it will be possible to develop a more efficient platform model.

## Declaration of Conflicting Interests

## Funding

## References

Adams, B.E. (2020). Why Silicon Valley has failed to replace your real estate agent (so far). In: *Hood Homes Blog*. https://www.hoodhomesblog.com/real-estate-industry/silicon-valley-has-failed-to-replace-real-estate-agents/ (Accessed: 2022-07-20).

Asensio-Soto, J.C., & Navarro-Astor, E. (2019). Proptech in Spain: A first approximation. In: Albiol J.R. and Medina F.J. (eds), *Research in Building Engineering, Exco'19* (pp. 14-23). Valencia: Edita.me.

Asensio-Soto, J.C., & Navarro-Astor, E. (2020). *Aproximación a la agencia inmobiliaria tradicional: Adaptabilidad y digitalización*. III Congreso Iberoamericano de Jóvenes Investigadores en Ciencias Económicas y Dirección de Empresas, 68-80.

Barresi, C.M. (1968). The role of the real estate agent in residential location. *Sociological focus*, 1(4), 59-71. https://doi.org/10.1080/00380237.1968.10570511

Barwick, P., & Wong, M. (2019). Competition in the real estate brokerage industry: A critical review. *Economic Studies at Brookings*, 1-34.

Blair Equity Research (2015). *Real Estate Services and Technology*.

Baum, A. (2017). *PropTech 3.0: The future of real estate*. Saïd Business School. University of Oxford Research.

Baum, A., Saull, A., & Braesemann, F. (2020). *PropTech2020: The future of real estate*. Saïd Business School, University of Oxford Research.

Benefield, J.D., Sirmans, C.S., & Sirmans, G.S. (2019). Observable Agent Effort and Limits to Innovation in Residential Real Estate. *Journal of Real Estate Research*, 41(1), 1-36. https://doi.org/10.1080/10835547.2019.12091517

Bernheim, B.D., & Meer, J., (2013). Do real estate brokers add value when listing services are unbundled? *Economic inquiry*, 51(2), 1166-1182. https://doi.org/10.1111/j.1465-7295.2012.00473.x

Bonilla, E., & Rodriguez, P. (2005). *Más allá del dilema de los métodos*. Bogotá, Colombia: Nomos.

Caballé, G. (2021). *La intermediación inmobiliaria ante los nuevos retos de la vivienda. Derecho de la vivienda*. Valencia: Tirant lo Blanch.

Catella (2016). *Proptech business models: Is the real estate sector facing a paradigm shift?*. Retrieved from: http://europe-re.com/proptech-business-models-a-paradigm-shift-for-the-real-estate-sector/62203 (Accessed: 2021-12-31).

Caven, V. (2012). Agony aunt, hostage, intruder or friend? The multiple personas of the interviewer during fieldwork. *Intangible Capital*, 8(3), 548-563.

Corbetta, P. (2007). *Metodología y Técnicas de Investigación Social*. Madrid: McGraw Hill.

Clandinin, D.J., & Connelly, F.M. (2000). *Narrative Inquiry: Experience and Story in Qualitative Research*. San Francisco: Jossey-Bass publishers.

Clayton, J., Fabozz, F.J., Giliberto, S.M., Gordon, J.N., Liang, Y., MacKinnon, G. et al. (2019). The world's oldest asset class enters the 21st century: how technology is transforming real estate investment. *Journal of Portfolio Management*, 45(7), 14-23. https://doi.org/10.3905/jpm.2019.45.7.014

Clotet, J., & Gallardo, H. (2018). *Personal shopper inmobiliario. El método Nexitum* (26). Madrid: Securat.

Filstad, C., & Gottschalk, P. (2009). How Knowledge Organizations Work: The Case of Real Estate Agencies. *International Real Estate Review*, 1, 88-97. https://doi.org/10.53383/100106

Fields, D. (2019). The Politics of Digital Transformations of Housing. *Planning Theory and Practice*, 20(4), 578-582. Publisher: Taylor & Francis,

Fields, D., & Rogers, D. (2019). Towards a Critical Housing Studies Research Agenda on Platform Real Estate. *Housing Theory and Society*, 38, 72-94. https://doi.org/10.1080/14036096.2019.1670724

Finnovating (2018). *Innovación y Real Estate y tendencias PropTech*. Retrieved from: https://www.finnovating.com/wp-content/uploads/2018/01/PropTech-Unconference-2017-pubic-Report-Finnovating.pdf (Accessed: 2022-01-23).

Finnovating, (2021). *Mapa proptech España*. Retrieved from: https://www.finnovating.com/news/mapa-proptech-espana/ (Accessed: 2022-01-23).

Flick, U. (2007). *Introducción a la investigación cualitativa*. Madrid: Ediciones Morata, S.L.

Friedman, I. (2020). *Rethinking PropTech: Drawing Insights about the Real Estate Technology Industry through Technical Experimentation.* Thesis in Carnegie Mellon University.

Gardès, N. (2019). Digitalisation du secteurimmobilier: la proposition de valeurphygitale au cœur de la performance. *La Revue des Sciences de Gestion, Direction et Gestion,* 299-300, 133-146. https://doi.org/10.3917/rsg.299.0133

González, I. (2017). El auge de las proptech: ¿Qué debemos esperar?. *Inmueble: Revista del sector inmobiliario*, 174, 50-53.

Goodchild, B., & Ferrari, E. (2021). Intermediaries and mediators: An actor-network understanding of online property platforms. Housing Studies. https://doi.org/10.1080/02673037.2021.2015297

Goodwin, K., & Stetelman, S. (2013). Perspectives on Technology Change and the Marketing of Real Estate. *Journal of Housing Research*, 22(2), 91-108. https://doi.org/10.1080/10835547.2013.12092075

Grele, R.J. (1990). La historia y sus lenguajes en la entrevista de historia oral: Quién contesta a las preguntas de quién y porqué. *Historia y Fuente Oral*, 5, 111-129. https://www.jstor.org/stable/27753314 (Accessed: 2022-02-12).

Gu, G., & Zhu, F. (2021). Trust and Disintermediation: Evidence from an Online Freelance Marketplace. Manage. *Scencei,* 67(2), 794-807. https://doi.org/10.1287/mnsc.2020.3583

Hernández, V., Puigdevall, A., & López Gustavo, A. (2021). *Revolución Proptech. Una reflexión sobre la transformación e innovación en el mercado inmobiliario.* Barcelona: Gestión 2000.

Hodgson, D., Paton, S., & Muzio, D. (2015). Something old, something new? Competing logics and the hybrid nature of new corporate professions. *British Journal of Management*, 26(1), 745-759. https://doi.org/10.1111/1467-8551.12105

Howell, E., & Lang, J. (2017). *Researching UX: User Research.* Australia: Sitepoint.

Iazzi A., & Trio O. (2016). Trust and Distrust in the Relationships between Construction Firms and Real Estate Agents: Empirical Evidence from Italy. *International Journal of Technology Marketing*, 11(4), 1-37. https://doi.org/10.5539/ijbm.v11n4p37

Ivens, F., & Barbiroglio, E. (2018). *Global funding for proptech sector grew to £8.5bn in 2017. Property Week.* https://www.propertyweek.com/finance/global-funding-for-proptech-sector-grew-to-85bn-in-2017/5096012.article (Accessed: 2022-01-23).

Kassner, A.J., Cajias, M., & Zhu, B. (2022). The PropTech investors' dilemma – What are the key success factors that secure survival?. *Journal of Property Investment & Finance.* https://doi.org/10.1108/JPIF-01-2022-0007

Lafuente Pastor, V.P. (2019). ¿Un cambio de paradigma en la construcción? Un estudio en Aragón sobre el organismo paritario del sector y la cualificación de la mano de obra como motores de la transformación. *LanHarremanak - Revista De Relaciones Laborales*, 41, 298-322. https://doi.org/10.1387/lan-harremanak.20561

Larceneux, F., Lefebvre, T., & Simon, A., (2015). What added value do estate agents offer compared to FSBO transactions? Explanation from a perceived advantages model. *Journal of Housing Economics*, 29, 72-82. https://doi.org/10.1016/j.jhe.2015.06.002

Lazar, J., Feng, J.H., & Hochheiser, H. (2017). *Research Methods in Human-Computer Interaction* (2nd ed.). Morgan Kaufmann.

Leavy, P. (2014). *Oxford Handbook of Qualitative Research.* Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199811755.001.0001

Levitt, S., & Syverson, C. (2008). Market Distortions When Agents Are Better Informed: The Value of Information in Real Estate Transactions. *The Review of Economics and Statistics*, 90(4), 599-611. https://doi.org/10.1162/rest.90.4.599

Maarbani, S. (2017). *Real Estate Technology: Threat or Opportunity? White Paper: The Future of RealTech*. Sydney: KPMG Australia and Real Tech Ventures.

McLaughlin, K. (2018). Why Your Next Real-Estate Deal Might Involve a Robot?. *The Wall Street Journal*, 1. https://www.wsj.com/articles/why-your-next-real-estate-deal-might-involve-a-robot-1519908587

Mejía, J. (2000). El muestreo en la investigación cualitativa. *Investigaciones Sociales*, 4(5), 165-180. https://doi.org/10.15381/is.v4i5.6851

Mencarelli, R. (2005). *L'interactionlieu-objetdans le cadre de l'expériencevécue: Approche par la valeur et la fidélité du consommateur.* Thèse de Doctorat en Sciences de Gestion, Dijon, Université de Bourgogne.

Ozols, R., & Fortune, C. (2012). *Towards the identification of factors affecting the development of small sized construction contacting organisations.* 28th Annual ARCOM Conference, Edinburgh. Association of Researchers in Construction Management.

Palm, R., & Bolsen, T. (2022). The Role of the Real Estate Agent. In: *Housing Market Response to Sea-Level Rise in Florida. Coastal Research Library* (vol 37, 53-65). Springer, Cham. https://doi.org/10.1007/978-3-030-88435-2_5

Pedreño, A. (2017). La digitalización y la economía global. Visión general. El cambio digital en la economía. Un proceso disruptivo. *Información Comercial Española, ICE*, 9-22.

Putzier, K. (2016). CRE tech: A promiseunfulfilled, the real deal. New York real estate news. https://therealdeal.com/2016/08/05/cre-tech-a-promise-unfulfilled/ (Accessed: 5/4/2022).

Rodríguez Ruiz de Villa, D. (2005). *El contrato de Corretaje Inmobiliario: Los Agentes de la Propiedad Inmobiliaria.* CizurMenor (Navarra): Thomson Aranzadi.

Roulac, S. (2019). The industrial revolution remembers. *Journal of Property Investment and Finance*, 37(4), 380-397. https://doi.org/10.1108/JPIF-02-2019-0023

Saiz, A. (2020). Bricks, mortar, and proptech: The economics of IT in brokerage, space utilization and commercial real estate finance. *Journal of Property Investment and Finance*, 38(4), 327-347. https://doi.org/10.1108/JPIF-10-2019-0139

Saull, A., Baum, A., & Braesemann, F. (2020). Can Digital Technologies Speed up Real Estate Transactions?. *Journal of Property Investment and Finance*, 38(4), 349-361. https://doi.org/10.1108/JPIF-09-2019-0131

Shaw, J. (2018). Platform Real Estate: Theory and practice of new urban real estate markets. *Urban Geography*, 6, 1037-1064. https://doi.org/10.1080/02723638.2018.1524653

Siniak, N., Kauko, T., Shavrov, S., & Marina, N. (2020). The impact of proptech on real estate industry growth. *IOP Conf. Series: Materials Science and Engineering* 869. https://doi.org/10.1088/1757-899X/869/6/062041

Talmatchi, M. (2020). *The implications of Proptech on the real estate brokerage. The case study of Dubai, United Arab Emirates.* Thesis from Heriot-Watt University.

Unissu (2019). *Global PropTech Analysis: Europe, Unissu Online.* https://www.unissu.com/proptech-resources/proptech-europe (Accessed: 23/01/2022).

Vargo S.L., & Lusch, R.F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1-17. https://doi.org/10.1509/jmkg.68.1.1.24036

Zhang, X., Lin, Z., Zhang, Y., Zheng, Y., & Zhang, J. (2021). Online property brokerage platform and prices of second-hand houses: Evidence from Lianjia's entry. *Electron. Commer. Rec. Appl.*, 50, C (Nov 2021). https://doi.org/10.1016/j.elerap.2021.101104