

Analysis of e-business models in real estate

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Published online: 10 July 2013
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Abstract We use Canvas Application Framework to analyze e-business models of Realestate.yahoo.com, Yahoo.com, Redfin.com, Realtor.com, Trulia.com, Zillow.com, and Craigslist.com. We investigate the similarities and differences among e-business models and how e-business model differentiation affects company success. We looked at which business model components, such as distribution channels, business partnerships, attracting customers, revenue streams, etc., are important. We further investigate whether the web-advertising, brokerage, virtual value-chain, or the diversified internet business model is used by each company, and which ones are more successful. We discover similarities and differences among e-business models. Differences include the use of revenue streams for generating revenue, the extent of partnerships, and the role they play in a company's success.

Keywords Canvas Framework · Real estate · Business models · E-business · Analysis

1 Introduction

Advances in technology have helped the development of many businesses [23] including real estate internet sites that enable on-line property searches and value creation. The Internet's ability to conveniently display information has improved real estate communications and transactions that foster closer working relationships among stakeholders [1]. Business models are conceptual instruments for rationalizing and

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expressing the business logic of companies and they are operationalized through Internet sites. They are essential to the success of organizations and represent the rationale of how organizations create, deliver, and capture value [24]. Understanding business models helps to identify opportunities to improve them and to experiment with new ideas [34]. Since they are the primary unit of analysis for understanding the allocation of resources and the distributing of profits [40, 46], it is important to understand their role and relevance in real estate. The internet has revolutionized the real estate industry but the importance of e-business models in this context, is not fully understood. Our principal research objective investigates the role that e-business models play in real estate. Specifically, we investigate the similarities and differences among e-business models and how their differentiation affects company success. We investigate which of the nine business model components, such as distribution channels, business partnerships, attracting customers, revenue streams, etc., are important. We further investigate which of the four internet business models (web-advertising, brokerage, virtual value-chain, diversified) each company uses, and which ones are more successful. We use Canvas Framework [35] to analyze the six e-business models under investigation [12].

This research makes several contributions to real estate e-commerce. First, the inherent components of e-business models of industry leaders serve as benchmarks for e-business models of competitors and new entrants into the industry. They guide companies on what should be included in a successful e-business model. Second, it helps to elucidate how e-business model components influence company performance and consumer behavior. Companies benefit from knowing which e-business components drive revenues, affect revenue streams, attract customers and advertisers, and nurture business relationships. Third, it helps companies to diagnose the strengths and weaknesses of e-business model components for capturing market share, and creating and delivering customer value. Fourth, companies benefit from understanding which of the four internet business models (web-advertising, brokerage, value chain, or diversified) is more successful or appropriate for implementing a particular e-business strategy. Finally, our findings are useful in assessing the readiness and competitiveness of real estate companies.

This research is motivated by the negative publicity of the real estate industry in 2008. The industry is recovering from poor image and slow growth causing many companies to go bankrupt while others struggle to stay alive. Understanding the strategies companies employ to create and capture value are vital to the longevity of the industry. The internet is an excellent vehicle for creating and delivering value and it has positively affected the industry. Prior to the internet, real estate was a local industry that relied on print media. It confined buyers, agents, and financiers to geographical areas where properties are located. The internet has expanded the geographical domain nationally and internationally by enabling seamless collaboration between agents, buyers, sellers, and financiers. Stakeholders can easily communicate, send and receive pictures of property listings, see videos of properties, and view electronic maps of properties all over the world. It is unprecedented the amount of property data and information that are available via the internet.

The paper is organized as follows. Section 2 is a literature review focusing on definitions of business and e-business models, and business model frameworks. Section 3 discusses real estate internet site business models. Section 4 discusses the

components of Canvas Framework. Section 5 uses the Canvas Framework to analyze and compare six real estate e-business models. The paper ends with a discussion in Sect. 6.

2 Literature review

2.1 Business model definitions

A business model is a conceptual construct that contains components and their relationships that allow for the expression of a company's business logic [33]. It is a buzzword that is seldom understood yet many definitions exist [19, 29, 40, 47, 49, 55, 56]. Stewart et al. [45] define business models as statements of how firms make money and sustain profits over time. Mayo et al. [28] define it as "the design of key interdependent systems that create and sustain a competitive business." Slywotzky [44] defines it as "the totality of how a company selects its customers, defines and differentiates its offerings, defines the tasks it will perform and those it will outsource, configures its resources, creates utility for customers and captures profits." Mahadevan's [27] framework for understanding e-business models has identified business model components that include the value stream for business partners and buyers. The framework is limited to the internet and not applicable across different industries. According to Venkatraman et al. [52], a business model is a coordinated plan to design strategies along three vectors (customer interaction, assets configuration, and knowledge leverage) while Johnson et al. [20] define it as consisting of four interlocking components (customer value proposition [CVP], profit formula, key resources, and key process) that create and deliver value. Methlie describes it as key components of a business [29] while Magretta [26] describes it as stories that explain how companies work and deliver value to customers. Similar definitions include Normann [32, 33], who distinguishes between three components: the external environment, the offerings of companies, and internal factors such as organization structure, resources, knowledge and capabilities, systems, and values. Morris et al. [31] and Shafer et al. [43] define business model as a concise representation of how decision variables related to venture strategy, architecture, and economics are used to create sustainable competitive advantage in defined markets. Dubosson-Torbay et al. [11] and Timmers [50] define a business model as an architecture for product, service and information flows, descriptions of business actors and their roles, and sources of revenues. Amit et al. [2] define a business model as "a system of interdependent activities that transcends the firm and spans its boundaries." For Chesbrough et al. [9] the business model is "the heuristic logic that connects technical potential with the realization of economic value," while Teece [48] defines it as a vehicle for articulating the logic, data and other evidence that support a value proposition for customers, and a viable structure of revenues and costs for companies delivering value to customers. For many, a business model is a conceptual instrument of the business [3, 13, 34, 36, 53]. These definitions describe company activities that capture the essence of how companies select customers, define and differentiate offerings, define tasks, configure resources, create value for customers, and capture profits. The primary differences are the components

of each business model and the configuration of resources employed to influence the perception of customer value. Successful companies differentiate themselves from competitors [43].

2.2 E-business model definitions

The internet has enabled new ways to deliver customer value by using e-business models that change how companies operate. E-business enables traditional businesses to evolve to a hybrid brick-and-mortar/online model. E-business as an approach for expanding traditional business models, increase markets, and grow revenue. Varying definitions exist [8, 30, 35, 40], for example, Timmers [50] defines eleven generic e-business models, from e-shops and e-procurement to trust and other third-party services. Tapscott et al. [46] propose a network-and-value-centered taxonomy with five types of value networks called “business webs,” which differ in their degree of economic control and value integration. Weill et al. [53] describe eight so-called “atomic” e-business models, each of which describes a different way of conducting business electronically; e-business initiatives can be represented by pure atomic business models or by combining them. Applegate [4] introduces six e-business models: focused distributors, portals, producers, infrastructure distributors, infrastructure portals, and infrastructure producers. Dubosson-Torbay et al. [11] identify principal dimensions—user’s role, interaction pattern, nature of the offering, pricing system, level of customization, and economic control—for classifying e-business models. Rappa [39] classifies companies based on their value proposition and modes of generating revenue. This classification has nine basic categories of e-business models: brokerage model, advertising model, infomediary model, merchant model, manufacturer model, affiliate model, community model, subscription model and utility model. E-business models consist of a set of components so we need to choose the appropriate framework to define the relationship between them.

The accelerating growth of e-business has raised interest in transforming traditional business models or developing new ones to better exploit opportunities enabled by technological innovations [37]. The internet has drastically changed the idea of a business model, which has practical implications for companies and industries. Consequently, real estate companies need to redefine customer value propositions, and the business operating model. Enhancing and expanding the customer experience help to reshape customer value propositions [5]. Creating new digital capabilities helps to refine the operating model by leveraging information to manage organizations, and integrating and optimizing digital and physical components [5].

Successful use of e-business models depends on the economic environment, market and industry conditions, and the internal and external factors affecting organizations. Internal and external factors influence the need for business model change. Internal functions include product/service innovation, performance and the availability of resources [14]. Product and service innovation is a key driver of new e-business models, especially for companies introducing new products or services to the market that require new skills, capabilities and processes that lead to new value propositions. Financial performance and the availability of key resources are both drivers and enablers of business model innovation. For the online real estate industry, the introduction of new services such as mobile device applications and online property value

analysis are considered internal factors. External factors include new entrants, competitors, customer preferences, customer segments, technology, regulatory/legal, and the business environment. When customer preferences for goods and services change, they force changes to the customer value proposition and the e-business model.

This e-business model review highlights two fundamental perspectives. Several researchers [4, 25, 46, 50, 53] posit various types of business models used to implement various approaches to e-business. On the other hand, Dubosson-Torbay et al. [11], Rappa [39], and Pateli et al. [37] emphasize the components that comprise e-business models without positing the various types of models that exist. This difference is not fundamental because e-business components could be applied to different e-business model types. The fundamental difference is the role and the level of importance components play in each e-business model.

2.3 Business model application frameworks

An application framework defines the purpose, scope, and primary components of a business model, and explores the relationships with business concepts, such as strategy and business processes [21, 22, 37]. Seven business model frameworks are discussed; the first is Canvas Framework [35] for describing, analyzing, and designing business models. It has nine building blocks that represent the logic of how companies make money. The blocks are customer segment, value proposition, distribution channels, key activities (or value configuration), key resources (or capabilities), customer partnership, revenue streams, and cost structures. They cover the main areas of businesses: customers, infrastructure, and financial viability. Canvas is a vehicle for describing business models with similar characteristics or behaviors. It is comprised of five patterns: Pattern 1 has three types of businesses (Customer Relationship, Product Innovation, and Infrastructure); Pattern 2 is Long Tail business models that offer a large number of niche products as opposed to a small number of best sellers. Pattern 3 is Multi-Sided-Platforms (or Markets) that bring together two distinct but interdependent groups of customers, such as Google, which brings the mass market (internet site viewers who perform searches) together with advertisers, or credit cards that link merchants with cardholders. Frequently in Multi-Sided Platforms, one segment of customers subsidizes another; for example, Google advertising revenues enable free online searching to customers. In Pattern 4, the free business model, at least one substantial customer segment is able to continuously benefit from a free-of-charge offer, such as advertising and newspapers, Metro, open source, and Skype. Pattern 5 is an open business model used by companies to create and capture value by systematically collaborating with outside partners.

The second framework is the Four-Box Business Model comprising the customer value proposition (CVP), profit formula, key resources, and key processes, presenting a road map to new possibilities for innovation and transformational growth [26]. The customer value proposition defines value to the customer, the profit formula defines value for companies, and key resources and processes define the components needed to deliver on the CVP at a profit. The third framework is the Service, Technology, Organization and Finance (STOF) model for new electronic mobile-related services [6]. It is an approach for mobile service innovation and consists of the service, technology,

organization, and finance domains. The domains interact and each is affected by market dynamics, technological advancements, and regulation. The fourth framework is Business Model Schematics [53], a map-like pictorial representation that highlights important components of an e-business model. The first element is the roles and relationships of major entities in the e-business model, the second is the major product flows, information, revenues and other benefits received by each participant. The fifth framework is technology/market mediation [9], which discusses business models in connection with technological innovation. The functions of an e-business model are to articulate the value proposition, identify market segments, define the structure of value chains required to create and distribute product offerings, estimate the cost structure and profit potential of producing the offering, describe the position of the company within the value network of suppliers and customers, and formulate competitive strategy to gain and maintain competitive advantage. The sixth framework is the entrepreneur's business model [31], which discusses e-business models from an entrepreneurship perspective that includes areas of venture strategy, architecture, and economics. Morris et al. [31] analyzed existing frameworks and theories to construct their business framework, which includes three levels—Foundation, Proprietary, and Rules—based on different managerial objectives. They discuss three levels for their framework based on the different managerial purposes of a model. The seventh and last framework is e3-value, which emphasizes the role of e-business models as the first step in requirements analysis for e-business information systems [15]. E3-value is an ontological model that expresses how economic value is created, interpreted and exchanged within a multi-party stakeholder network of enterprises and customers. Its modeling constructs are actor, value object, value port, value interface, value exchange, market segment, value activity and dependency path. All seven frameworks have some common and overlapping components, some more specific than others.

According to [35], a business model is a conceptual tool with components that allow for the expression of a company's business logic. The e-business model is a vehicle for expressing that logic and is an extension of the business model. We adopted the six dimensions of the Dubosson-Torbay et al. [11] e-business model because they are comprehensive, intuitive, and they guide our selection of a suitable application framework for our work. His work influenced our decision to select Canvas Framework by Osterwalder et al. [33], because we found it more suitable, comprehensive, detailed, and intuitive than the other six models. It is suitable because the sub-components of the building blocks are intuitive, easily identifiable, and quantifiable. Unlike STOF and other frameworks, it encompasses the essence of the other six frameworks and it is appropriate for the detailed analysis we wanted to perform. It provides a richness of analysis unmatched by other frameworks. Canvas is comprised of nine components called building blocks, more than any other framework. One of the six frameworks has only three components, exemplifying the lack of detail required for a thorough analysis of e-business models. Each of the nine building blocks has one or more sub-components that provide additional detail unrivaled by other business models. For example, the value proposition block of Canvas has several components including newness, customization, and usability that are missing from other frameworks. The revenue stream block includes both brokerage and advertising, important sub-components that are missing from other frameworks. Canvas includes six principal

dimensions (user role, interaction pattern, nature of offering, pricing, customization, and economics) identified by Dubosson-Torbay et al. [11] that enable a richer analysis and comparison of e-business models.

3 Real estate website/internet business models

The real estate industry is undergoing changes that may affect the kind of e-business models adopted by companies. Companies collaborate with organizations to develop new product and services to better satisfy customers' needs. Mobile applications provide new services that enable customers to view MLS listing of homes on their phone. Basic business models used in some industry niches are unable to facilitate advanced interactions found in other areas of the industry, where services are diverse. The economic value and interaction within the industry are based on the brokerage, advertising or value-chain model. There are four types of real-estate internet business models, diversified, web-advertising, brokerage, and virtual value-chain and it is possible to create hybrid internet business models. The four types of internet business models discussed in Sect. 3 are inextricably linked to the analysis of the six e-business models under investigation in Sect. 5. Internet business models inspire and influence the choice of internet design elements, features, and capabilities of e-business models. If the objective is to create a virtual user environment [25] among buyers, brokers, and financiers, the brokerage model is more appropriate. If the objective is to maximize advertising revenue, the advertising model is suitable. However, if the objective is to create value by digitizing information, the virtual value-chain excels. It is common to see hybrid e-business models when companies attempt to satisfy multiple objectives, such as maximizing advertising revenue, fostering relationships, or digitizing information. Section 6 identifies and discusses the types of internet business models implemented in each of the six e-business models under investigation.

3.1 The web-advertising model

This is an extension of the traditional media broadcast model. The broadcaster is an internet site that sometimes provides free content and services (email, IM, blogs, etc.) mixed with advertising messages in the form of banner ads. One of the most sophisticated forms of internet advertising is the Google ad. Banner ads are a major source of revenue for broadcasters. The internet site platform attracts users with free content, products, or services and it generates revenue by selling space to advertisers. It is a popular and rapidly growing advertising model [17, 18] that is used by craigslist.com, Realestate.yahoo.com, realtor.com, Trulia.com, and Zillow.com.

3.2 The brokerage business model

This model brings brokers, sellers, and buyers together to do business. The broker charges a fee to at least one party involved in the transaction. Brokers connect consumers with retailers, businesses and consumers. In real estate, online companies enable the search for properties and provide brokerage services. Companies that use the

brokerage model make money from commissions and from a variety of service fees. The payment of a commission to a brokerage is contingent upon finding a satisfactory buyer, a successful negotiation of a purchase contract between buyer and seller, the settlement of a transaction and the exchange of money between buyer and seller. The median commission charged to sellers by listing agents is 6 % of the purchase price and it is divided between the selling and buying agent. At closing, the seller pays the real estate commission. Of the six sites, only Redfin.com and Realtor.com use this model.

3.3 The virtual value-chain business model

This model supports the traditional value chain and it is used by all six companies. It has changed the way businesses operate due to the growth of the internet [41]. The traditional value chain views information only for support but the virtual value-chain views information as a value-creating opportunity where products and services are in the form of digital information delivered through information-based channels.

3.4 The diversified model

This model helps companies expand their core business to related products and services. The network of entities is owned by a single parent company and it provides for an integrated product-service mix. The model has several merits, none of which is that it enables companies to reduce reliance on core products and spread their risk by moving into other market segments by offering combined product-service packages. It offers opportunities to develop powerful brands and to acquire better corporate image. However, one drawback is that it requires more investment in new technology and major cultural changes in providing diversified product/services instead of a single product/service. Diversifying the business could lead to additional risks, which explains why it is not used by any of the six sites.

4 The canvas application framework

Canvas Framework [35] has nine blocks:

1. Key Partners
2. Key Activities
3. Key Resources
4. Value Proposition
5. Customer Relationships
6. Channels
7. Customer Segments
8. Cost Structure
9. Revenue Streams

Key Partners describe the network of suppliers and partners that collaborate with the business and are supported by the business model. Value proposition is the bundle

of products and services that create value for customers. Value propositions may be quantitative (e.g., price, speed of service) or qualitative (e.g., design, customer experience), and consist of components including newness, performance, customization, effectiveness, design, brand/status, price cost reduction, risk reduction, accessibility and convenience/usability, components that create value for customers [35]. In our analysis, we concentrate on newness, usability and performance of services, customization, and internet site design. Newness refers to a new product/service offering made available through the internet. Usability is a quality measure of the graphical user interface user-friendliness and its performance is measured by the efficiency of internet site features and services. Customization is the process that adapts products and services to the specific needs of individual customers or customer segments to create value. Website design is the selection and coordination of available components to create the layout and structure of the site and it significantly affects internet-marketing efforts. Customer segments are different groups of people an enterprise aims to reach and serve. Channels describe how companies communicate with customers and the chain of businesses or intermediaries through which goods and services flow on their way to the final consumer. Customer relationships describe the connections between a company and its customers; these relationships can range from personal to automated services. Personal services are human interaction and automated services are a blend of sophisticated customer self-service with automated processes. Key activities are the business processes and resources for creating value to customers, and differ depending on the type of business model. The key activity building block is comprised of three components: product, problem solving and platform/network [35]. Product activities relate to designing, making, and delivering products and production activities are prevalent in business models of manufacturing firms. Problem solving activities are tasks used to find solutions to customers' problems. Business models that have a platform as a key resource are dominated by network-related key activities. Networks, matchmaking platforms, software, and brands can function as platforms. We choose to discuss software platform/network activities because they are appropriate for discussing e-business models. Key resources refer to the ability to execute a repeatable pattern of actions that is necessary to create value for customers. Different key resources are needed depending on the business model and can be physical, financial, intellectual or human [35]. We discuss the physical, intellectual, and human resources while the financial resources are discussed in the revenue streams section below. Intellectual resources are brands, proprietary knowledge, patents and copyrights, partnerships, and customer databases. Physical resources are tangible assets such as manufacturing facilities, buildings, vehicles, machines, systems, point-of-sales systems, and partner networks. Human resources are employees such as agents or brokers. Revenue streams are the avenues through which companies generate revenues. In real estate, it is mostly by way of brokerage and advertising fees that come from the sale of real assets, usage and subscription fees, lending, renting and leasing, licensing, brokerage and advertising fees [35]. Cost structure represents monetary transactions employed in the business model.

5 Analysis of e-business models using canvas framework

We compare the business models of six of the most popular and successful online real estate internet sites using the Canvas Framework [12]. The popularity of the sites is determined by the company's estimated value according to business insider 2011 report [7] and the percentage of visitors [51].

The ranking of the sites, which is a measure of success, fluctuates over time. For example, Realtor.com and yahoo Real Estate have traded places seven times in one year as they battle for supremacy in the real estate market. However, Silicon Alley Insider list of top technology startups in 2011 with high estimated valuations, has Craigslist.com ranked 10th with an estimated value is 2.5 billion. In 2010, it was ranked fifth with estimated value of \$3 billion. Trulia.com, ranked 30th on this year's list, is estimated at \$700 million. Redfin.com currently ranked 64th is estimated at \$230 million [7]. Zillow.com on the top 100 list in 2010 is 104th and estimated at \$60 million. Zillow has provided estimated property values on 100 million homes throughout the U.S. and has about 12.5 million visitors a month [7]. The top ten sites account for about 40 percent of all visits. Zillow had the greatest market share in June (8.61 percent), followed by Trulia (6.89 percent), Realtor.com (6.52 percent), and Yahoo Real Estate (6.06 percent) [51].

We selected the six sites because of their popularity and leadership position in the industry [12]. They are representative of real estate sites. The criteria used in selecting them are as follows: The sample is representative because the six sites exhibit a core set of services found among the population of real estate internet sites. They include mobile applications, advanced property searches, map interfaces, home alerts, demographics data, MLS listings, property listing prices, ability to contact agents, location searches, ability to save searches, advice forums, new property listings, and property value analysis. The sample is also representative because it includes sites that use web-advertising, virtual value-chain, or the brokerage model. All the sites use web-advertising except Redfin.com; Realtor.com uses the brokerage model and all except Craigslist.com use the virtual value-chain.

Sites were selected based on the five benefits mentioned in the introduction. They offer common e-business services that act as e-business model benchmarks for competitors and new entrants, benefit number one. Zillow.com provides users with the ability to appraise properties using proprietary technology called the "Zestimate." Similarly, Redfin.com uses a combination of online searching with access to live agents. Realtor.com has the ability to list properties worldwide. Both Zillow.com and Trulia.com have property price-estimation tools. Trulia's estimation tool is called Trulia Estimate and Zillow's is called Zestimate. These are examples of business strategies and internet features that force competitors to better compete. How consumers react to the changes provides evidence of benefit number two, which is company performance. The financial benefits of the web-advertising model have worked well for Trulia, Zillow, and Yahoo. Benefit three helps in examining the offerings and features across e-business models and helps in assessing the strengths and weakness of competitors' e-business models. It further helps in setting expectations for new entrants and in understanding which e-business features create and deliver value to customers, which is benefit four. Benefit five, helps to examine the collective set of

features and performance indicators across the six sites and serves as a barometer for measuring company readiness and competitiveness.

The data in Table 1 were collected in four ways. First, we performed online feature analysis of each of the six sites. We logged into each site to discover the various features available to users. We then used each feature to assess its capability and user friendliness. Second, we analyzed company financial performance and business reports [54]. Third, we analyzed technical reports conducted by consulting companies such as Clarity [10]. Lastly, we gleaned data from research papers on the subject.

Value proposition—newness dimension Zillow.com has a new and interesting property estimate algorithm called Zestimate. It provides Zillow users with home value estimates that are calculated on a range of publicly available information including sales of comparable houses in a neighborhood. This feature is widely used by the other internet sites. Redfin.com's new features provide users access to live agents. Its Agent Scouting Report provides vital statistics on more than one million real estate agents across the country. It allows anyone to type in the name of an agent and see what the past 36-month production statistics are for that agent. The new feature for Realtor.com is DocuSign, allowing National Association of REALTORS (NAR) members to sign documents anytime and anywhere on any device using the DocuSign for Realtors for free, with unlimited signers and unlimited file storage. The NAR launched the Realtor.com international web site, which makes available to buyers across the globe millions of for-sale property listings on Realtor.com. Foreign content providers provide residential properties to the site. Trulia.com plans to launch Trulia Estimates, its version of property valuations for consumers who compete with public internet sites, rivals Zillow and Zestimates. For Realestate.yahoo.com, the new feature is the capability to display the user's location on the website.

Value proposition—usability and performance dimension The mobile device application in Zillow.com is helpful and user friendly. The elegance of the graphical user interface is helpful, and provides real estate data and information quickly and efficiently. Search pages have average sales prices in each city and provide a list of agents and a button to call them directly. Redfin.com offers consumers unlimited home tours and dedicated agent's support throughout the home-buying process. Realtor.com continues to improve lead capture, increase exposure of company listings, and improve the overall web site experience for real estate buyers and sellers. Trulia.com improves performance by launching a free system, Trulia Direct Reference, to identify discrepancies between real estate listings from multiple listing services and third-party syndication sites. Participating MLS's provide accurate reference data (e.g., list price, status, etc.) about their listings; Trulia identifies data that are different from the MLS data and the data provided by third-party syndicators and non-MLS sources. It automatically reports data inconsistencies back to the MLS broker and listing agent, providing full transparency into the data it publishes in its search index. Realestate.yahoo.com offers an easy home search service and useful tools that provide easy access to millions of property listings, a mortgage calculator, and market snapshot information. Craigslist.com allows users extensive search capabilities that enable them to search millions of classified ads.

Table 1 Business models comparison

	Zillow.com	Redfin.com	Realtor.com	Trulia.com	Realestate.yahoo.com	Craigslist.com
Value Proposition	Newness: The users have the possibility to appraise the property values based on undisclosed factors using a proprietary algorithm called the “Zestimate.”	Newness: Redfin uses an interesting combination of online real estate search and access to live agents. Also the company announced the release of its Agent Scouting Report in its various markets around the US.	Newness: DocuSign, the electronic signature provider, makes available DocuSign for Realtors. Realtor.com launched the international version of the web site.	Newness: Trulia.com set to launch Trulia Estimates.	Newness: Realestate.yahoo.com Yahoo real estate displays predominantly on the home page the user location once the client visits the website.	
	Usability & Performance of Services: Zillow Mobile applications are easy to use and provide real estate data and information to users quickly and efficiently.	Usability & Performance: Redfin’s application was developed to provide the best possible user experience.	Usability & Performance Realtor.com makes ongoing and frequent changes to improve its performance.	Usability & Performance Trulia prototyped a solution to the distribution of inaccurate listing data across the internet called Trulia Direct Reference (TDR), a quality assurance system.	Usability & Performance The Yahoo real estate website actual search process is simple and straightforward.	Usability & Performance Craigslist’s approach revolutionized the ease and speed with which people could create an online community that would facilitate the exchange of ideas, goods and services.

Table 1 (Continued)

	Zillow.com	Redfin.com	Realtor.com	Trulia.com	Realestate.yahoo.com	Craigslist.com
	Customization: This website provides these features: establish an account, login, MLS listing, listing price, find an agent, location aware search, saved search, advanced search, advice forum, new listing, mobile device application, home alerts, value analytics, map interface and demographics.	Customization: This website provides these features: establish an account, login, MLS listing, listing price, find an agent, location aware search, saved search, advanced search, advice forum, new listing, mobile device application, home alerts, value analytics, map interface and demographics.	Customization: This website provides these features: establish an account, login, MLS listing, listing price, find an agent, location aware search, saved search, advanced search, advice forum, new listing, mobile device application, home alerts, map interface.	Customization: This website provides these features: establish an account, login, MLS listing, listing price, find an agent, location aware search, saved search, advanced search, advice forum, new listing, mobile device application, home alerts, map interface. Trulia.com adds the Trulia Stats widget and the Trulia Slide Show Widget.	Customization: This website provides these features: establish an account, login, MLS listing, listing price, find an agent, location aware search, saved search, advanced search, advice forum, new listing, home alerts, value analytics, map interface and demographics. Realestate.yahoo.com Yahoo real estate does not have the mobile device application.	Customization: This website provides these features: MLS listing, listing price, advice forum, advanced search, advice forum, new listing.
Target customer	Design: The website has superior design. Buyers, sellers and house owners. Brokers, agents and bank.	Design: The website has superior design. Buyers, sellers, house owners, brokers, agents and bank.	Design: The website has superior design. Buyers, sellers, house owners, brokers, agents and bank.	Design: The website has superior design. Buyers, sellers, house owners, brokers, agents and bank.	Design: The website has superior design. Buyers, sellers, house owners, brokers, agents and bank.	Design: The website has simple design. Buyers and sellers.
Distribution channel	Web sale, advertisement on other Web sites, newspapers.	Web sale, advertisement on other Web sites, newspapers.	Web sale, advertisement on other Web sites, newspapers.	Web sale, advertisement on other Web sites.	Web sale, advertisement on other Web sites, newspapers.	Web sale, advertisement on other Web sites, newspapers.

Table 1 (Continued)

	Zillow.com	Redfin.com	Realtor.com	Trulia.com	Realestate.yahoo.com	Craigslist.com
Relationship	Personal services: agents, brokers and lenders advertising. Automated services: The users can access the customized services.	Personal services: Lenders, buyers and sellers forums. Automated services: The users can access the customized services.	Personal services: NAR members, buyers, sellers. Automated services: The users can access the customized services.	Personal services: Buyers, lenders and sellers. Automated services: The users can access the customized services.	Personal services: Lenders, buyers and sellers forums. Automated services: The users can access the customized services.	Personal services: Lenders, buyers and sellers forums. Automated services: The users can access the customized services.
Value configuration	Platform/Network: The website continually improves. The company improved the Zestimate algorithm precision.	Platform/Network: The website continually improves. The company upgrades the iPhone app.	Platform/Network: Realtor.com website continually improves. It has extended to Realtor.com International web site.	Platform/Network: The website continually improves. Trulia.com launched a test version of its new real estate valuation service, Trulia Estimates.	Platform/Network: The website continually improves. The company has also introduced a range of new features for real estate professionals.	Platform/Network: Craigslist company has consistently focused on the simplicity and usefulness of their site, with an extremely high-degree of availability.
Capability	Physical resources: Partner network. Human resources: Brokers.	Physical resources: Partner network. Human resources: Brokers.	Physical resources: Partner network. Human resources: NAR members.	Physical resources: Partner network.	Physical resources: Partner network.	Physical resources: Partner network.

Table 1 (Continued)

	Zillow.com	Redfin.com	Realtor.com	Trulia.com	Realestate.yahoo.com	Craigslist.com
Partner-ship	Acquisition of particular resources and activities: YahooReal Estate: partnership. Zillow Mortgage Marketplace has Distribution Partnership with Redfin.Mortgage Concepts, LLC. AmeriSave partnership.	Acquisition of particular resources and activities: Zillow Mortgage Marketplace.	Acquisition of particular resources and activities: The National Association of REALTORS launched a partnership with Olinger Group.	Acquisition of particular resources and activities: CNNMoney and ForRent.com announced a partnership with Trulia.com.	Acquisition of particular resources and activities: Yahoo Real Estate and Zillow have entered into a partnership that will place targeted ads that real estate agents and brokers purchase from Zillow in property search results on both sites.	
Revenue Streams	Advertising: The website makes money from broker, agent and bank ads.		Advertising: The realtor pays monthly fees to Realtor.com to get his/her name to show up on top 10 % of the time in a rotation.	Advertising: Trulia.com makes money by selling ad space, and having real estate agents pay to get more features on the site.	Advertising: Yahoo real estate sells display advertising on the website to new home builders, real estate agents and brokers. Yahoo has advertising partnership with Zillow; all showcase ads and featured listings ads purchased through Zillow will automatically appear on both Zillow and Yahoo Real Estate.	Advertising: The website makes money from the company's placing job adverts in San Francisco, Los Angeles and New York.

Table 1 (Continued)

	Zillow.com	Redfin.com	Realtor.com	Trulia.com	Realestate.yahoo.com	Craigslist.com
	Broker age: The revenue stream derives from intermediation services performed on behalf of two or more parties. Brokers and real estate agents earn commissions each time they successfully match a buyer and seller. Broker age: The revenue of this website relies on the percentage of the transaction commission for generating leads. Paid subscription: To diversify from advertising as its primary income source, Trulia started offering subscription services to real estate agencies and mortgage brokers.					
Cost structure	Platform development & management	Platform development & management	Platform development & management	Platform development & management	Platform development & management	Platform development & management

Value proposition—customization dimension The virtual value-chain describes the dissemination of value-generating information services throughout an extended enterprise. It starts with the content supplied by the provider, which is then distributed and supported by the information infrastructure. Regarding customization, internet sites offer a bundle of services to users that could be provided by third-party providers (except Craigslist.com), which shows that internet sites could be classified as virtual value-chain business models. Zillow.com, Redfin.com, Realtor, and Trulia.com have a mobile application, each with a different utilization. Zillow.com, Redfin.com, Realtor.com and Trulia.com have a mobile application that has different usage modes. The mobile application in Zillow.com shows nearby homes for sale, estimated home values, historical property records, for-sale listings, photos and Google Street view. Users can calculate mortgage rates and estimated home loans. Redfin mobile application has the capability to enable interaction between users and agents. It helps buyers, sellers and real estate agents establish fair pricing for homes using Comparative Market Analysis. The Realtor.com iPad app provides consumers with a direct line of communication to realtors via the internet. Trulia.com has the TruliaStat, which enables users to add a local real estate trend chart to their web site or blog for no additional cost. The Trulia SlideShow Widget puts the focus on every homebuyer's favorite listing feature—photos: users can customize the widget to display their listings so visitors can sit back and enjoy the show. Realestate.yahoo.com does not have a mobile device application.

Value proposition—website design dimension Redfin.com adds a new visual design to make it easier for consumers to engage Redfin agents at any time during their search. Trulia.com offers a new dynamic search page and much larger photos on its listing page. In Realtor.com, the Mobile Widget will be removed, the Real Estate News and Advice will be temporarily removed and the number of searchable neighborhoods on Realtor.com will increase significantly. In comparison, Zillow.com and Realestate.yahoo.com have elegant designs but the design of Craigslist.com is simpler and more intuitive.

Target customer All internet sites, with the exception of Craigslist, have identical customer types. They include buyers, sellers, house owners, brokers, agents, and banks. Craigslist.com is limited to buyers and sellers only.

Distribution channel Internet sites facilitate communication and the ability to reach customer segments to deliver value propositions, such as sales, online advertisements, and newspapers.

Relationship—personal services dimension With respect to personal services, Zillow.com establishes relationships with agents, brokers and lenders that advertise. By comparison, Redfin.com, Realestate.yahoo.com, and Trulia.com establish relationships with identical customer segments including lenders, buyers, and sellers.

Relationship—automated services dimension Users can access customized services on all internet sites.

Value configuration—platform/network dimension Internet sites continue to improve their platforms. Zillow.com improves the Zestimate median margin of error to 8.5 percent nationwide, and 6 percent in major metropolitan cities such as Denver, San Diego and Washington DC. Reducing the margin of error produces more accurate results that lead to higher levels of customer confidence. Redfin.com updated its iPhone app to offer listings that are more comprehensive to registered users. It provides a complete history of property pricing and allows iPhone users to see the rise and fall of property prices. Registered users can see Redfin's Agent insights and read agents comments. The comments that Redfin agents make in Agent Insight, are automatically e-mailed to listing agents. The NAR launched an international website with 4.4 million listings and translation capabilities in eleven languages, including double-byte character languages such as Chinese, Japanese, and Korean that pose challenges for programmers. The new site delivers millions of for-sale property listings displayed on Realtor.com to buyers across the globe, as well as information on residential properties provided by foreign content providers. Trulia.com will launch Trulia Estimate, a property price-estimation tool. Currently, Trulia Estimates covers five counties in the San Francisco Bay area and plans to expand nationally. The new release will allow consumers access to Trulia property valuation estimates on more than one million Bay Area homes. Trulia Estimates are derived from local real estate information, including recent prices of similar homes, and inputs from local agents, buyers, and owners. Realestate.yahoo.com brokers are syndicating their listings and one can purchase classified listings on the site. After Realestate.yahoo.com brokers purchase a classified listing, they can use the real estate listing syndication process to post their listing's information on other sites around the internet. The combination of Craigslist.com speed and full text search has enabled the Craigslist website to serve its users by enabling people to help each other with everyday tasks. Craigslist.com services approximately 50 million searches per month.

Capability—physical resources dimension All websites create and offer value propositions through the association with partner networks.

Capability—human resources dimension Redfin.com and Realtor.com exploit human resources. Brokers bring buyers and sellers together and generate commissions, which are shared by the company. For Redfin.com, human resources are brokers and for Realtor.com human resources are National Association of REALTORS (NAR) members.

Partnership—acquisition of particular resources and activities dimension Zillow.com has a partnership with Realestate.yahoo.com, sells local advertising on both sites and for-sale listings on Zillow appear on the Yahoo! Real Estate. In addition to selling local ads, Zillow sells national display advertising across both sites to new homebuilders, real estate agents, and brokers. Any for-sale listings that appear on Zillow will automatically appear on Yahoo! Real Estate website. This partnership enables the two websites to better serve the advertising needs of real estate agents and brokers. Furthermore, Zillow mortgage marketplace announced a distribution partnership with Redfin. Visitors to Redfin's website can fill out a mini-loan request

form on the 'Financing Your Home' page. This attracts potential borrowers to Zillow Mortgage Marketplace, where they can complete a Zillow Loan Request Form and instantly get custom quotes from Zillow's large network of lenders. By adding the Zillow Mortgage Marketplace experience to their website, Redfin helps clients navigate the mortgage process. Mortgage Concepts LLC, has a partnership with Zillow Mortgage Marketplace that provides users with instant mortgage quotes, available homes for sale, and other useful research tools for market and property data. Realtor.com announced partnerships with The Olinger Group, a full-service custom market research company. The partnership allows Realtor.com to know more about members and homebuyers, thus fostering a satisfying home buying experience. The Olinger Group conducted several studies with NAR's membership via online, telephone, and focus groups. Using mail and internet surveys, it collected extensive detailed information on homebuyers' preferences for specific features when purchasing homes. The survey information allowed the National Association of REALTORS to understand the needs of their members. Trulia announced a partnership with CNNMoney, the online home of *Fortune* and *Money* magazines. This partnership makes Trulia the exclusive provider of real estate listings on CNNMoney. The CNNMoney/Trulia co-branded website enables users to easily search for properties and refine their search results based on criteria such as open houses, neighborhood, price, and property type. Trulia.com has a partnership with ForRent.com, a leading resource for searching apartments nationwide. It has a strategic partnership with RE/MAX LLC, to directly syndicate RE/MAX listings to Trulia's search index. As part of the agreement, RE/MAX agents and brokers receive partner benefits on Trulia's hyper-local marketing and advertising solutions, Trulia Pro and Trulia Local Ads.

Revenue stream—advertising dimension Some real estate websites use a web-advertising strategy to make money from agents, brokers and mortgage bank ads. Agents and brokers buy local advertisements and they pay websites to display property listings and contact information such as agent name, property address, and property price. All six websites except Redfin.com use a web-advertising strategy. Zillow.com, a media company, generates revenue by selling advertising and this enables Zillow to offer free service to users. The revenue is used to build new internet services. Zillow offers brokers and agents the ability to purchase featured listings that appear by default at the top of a customer's property search page. It allows agents and brokers to purchase showcase ads in desired ZIP codes. Zillow's current mobile platform delivers value to advertisers through its location-based advertising options. Realtor.com, affiliated with the National Association of REALTORS, enables agents to buy advertising on the spot. Agents have various options to market featured homes to fluent clients or to advertise their services in banner ads based on location. Pricing for realtors who choose to enhance their property and personal advertising, is based on the cost per thousand of consumers reached by the advertisement. Advertising is subject to tight controls, including ads from other realtors. Trulia.com, a nationwide residential real estate search engine, announced the creation of Trulia Local Ads, a self-service platform designed for advertisers looking to reach active homebuyers and sellers. Trulia Ads enable real estate professionals to purchase advertisement space on Trulia's search and listing pages.

Revenue stream—paid subscription dimension Trulia Local Ads introduced new ways to build effective advertisements using an automatic campaign creation tool. Real estate professionals select from several templates using listing data and information from their Trulia real estate profile to create high performing, dynamically updating advertisements. Trulia Local Ads provide flexibility for advertisers to upload images and create custom campaigns on their own. The partnership between Realestate.yahoo.com and Zillow.com creates the largest real estate network on the internet, enabling real estate agents to advertise locally on Yahoo. Homebuyers have access to more local listings on Yahoo Real Estate along with more photographs. Zillow will serve as the exclusive provider of for-sale property listings information on the Yahoo Real Estate website, and Yahoo will continue to control the appearance of for-sale listings and will maintain separate databases for foreclosures, newly constructed homes, and rentals. It is not the first time Realestate.yahoo.com has collaborated with other real estate companies to provide for-sale property listings content. Yahoo and Prudential Real Estate entered into an exclusive agreement in 2004 for Prudential to provide for-sale listings information, but that arrangement ended in 2008. Lastly, we have Craigslist.com, a centralized network of online communities, featuring free online classified advertisements with sections devoted to jobs, housing, personals, and for-sale services. Most postings on Craigslist are available free of charge. Paid advertisements include those from Los Angeles, San Francisco, and New York and the charge is very nominal.

Revenue stream—information brokerage discount dimension Redfin.com, an online real estate brokerage, uses a discount brokerage business model strategy. Redfin's agents handle every aspect of a transaction, including tours, pricing analysis, negotiations, inspections, and closings. It is the only major search site to feature listings from broker databases, as well as for-sale-by-owner and foreclosure properties from the internet. Redfin pays its agents customer-satisfaction bonuses, not commissions; it surveys every client and publishes each survey along with the agent's entire deal history. Since Realtor.com is the official site of the National Association of REALTORS, we classify it as a brokerage business model. Its revenue is generated from agents and brokers' commissions. Generally, the commission earned by a buyer agent comes from the commission the seller agrees to pay the listing agent.

Cost structure—platform development & management dimension The primary costs are associated with developing and managing the platform. They include hardware architecture, and software including application frameworks. This may include automated online assistants, customer service, customer-relationship management system, and business intelligence.

6 Conclusion

Understanding business models is an important step in changing, improving, and innovating e-business models. We analyzed, using the Canvas Framework, six well-known e-business models from Zillow.com, Redfin.com, Realtor.com, Trulia.com,

Realestate.yahoo.com, and Craigslist.com. The analysis included e-business components such as value proposition, target customer, distribution channels, value configuration, capability, partnerships, and revenue streams. Understanding key e-business components helps to identify key factors that drive the development of new and innovative business models. Canvas Framework consists of nine building blocks that represent the logic of how companies generate revenue.

The six e-business models have similarities, differences, and common features. Similarities include online searches of properties, the ability to contact agents and list properties, the ability to target customers (sellers, buyers, and agents), advertisements, personal and automated services, and relationships with business partners. The target customer is similar across the six companies, except for Craigslist.com, which only caters to buyers and sellers. Unlike the other sites, Craigslist.com does not focus exclusively on real estate but dabbles in other areas of e-commerce such as the sale of goods and services, employment, and so on. Distribution channels are identical except that Trulia.com does not advertise in newspapers. Continuous website improvement is one aspect of value configuration that is common across sites. Companies differentiate themselves from competitors by adding new features or services to attract customers. Differences such as the newness feature of the value proposition exist. Zillow's new service, the ability to perform online property appraisal, is an attempt to increase efficiency, provide convenience, and increases the value proposition for customers. Traditional property appraisal is time consuming and inconvenient as customers have to identify appraisers, schedule appraisal appointments, and be available for the appraisal. This delays the buying and selling of properties and reduces product turnover and revenue. Redfin provides online property searches and access to live agents. It recognizes the benefit of having live agents available to answer questions. Buying and selling real estate require trust between buyers, sellers, agents, appraisers, financiers, and brokers. Real estate transactions require many in-person signatures so Realtor enables electronic signatures, a value added service for customers. Estimating property values requires the help of agents who compare the property of interest to similar properties in the neighborhood. Trulia, by providing online property estimates, has increased the value proposition of customers. Another difference is revenue sources, and the increased profitability of Realtor.com is attributed to the two revenue streams it employs, web-advertising and information brokerage. More streams of income naturally translate into increased revenues so companies with a single income stream may benefit from additional revenue streams. The number of partnerships seems to influence Zillow's popularity and success. Partnerships, popularity, and success appear to be correlated as Zillow has the most partners and this provides access to additional customers. Zillow.com uses technologies like mobile applications that provide additional services to attract customers and improve their satisfaction.

The differences between business models help to differentiate one company from another. Our findings suggest that e-business model differentiation plays a role in the success of companies. Customer are reached through various distribution channels. The resources used to reach, create and deliver value to them are a combination of products, services and technologies including mobile applications. Several sites do not have mobile applications but this will change as mobile technology becomes

more mainstream [42]. A major factor in creating value to customers is through the convenient access to information and services related to real estate transactions. This includes access to agents, property information, location data, access to financiers, and mortgage analysis. Companies that combine the web-advertising and the value-chain model, rank higher [51].

All sites use the nine building blocks but none uses all of the sub-components in each block. Realtor.com is the closest to achieving this objective because the only component it lacks is paid subscriptions. Zillow.com does not rely on human resources because it has no agents and brokers, no brokerage, or paid subscriptions. Redfin.com has no advertising or paid subscriptions so its revenue is generated from brokerage fees. Trulia.com has no human resource or brokerage, relying solely on advertising for revenue generation. Craigslist has no new services, no partners or human resource capability, and does not rely on brokerage or paid subscriptions. The lack of these services partially explains why Craigslist is the least popular of the six sites. Unlike the others, it does not concentrate exclusively on real estate. Realestate.yahoo.com is similar to Craigslist but the big difference is that Realestate.yahoo has partnerships with other companies that provide additional sources of revenue.

Studies indicate that Realestate.yahoo.com, Realtor.com, and Zillow battle for the leadership position in the industry [16, 38]. In 2011, Realestate.yahoo rated number one in market share while Realtor was number two, but in June 2012, Zillow was number one. All three sites have no paid subscriptions, do not rely on brokers and agents, and do not use brokerage except for Realtor. This suggests that the absence of paid subscriptions, brokers, agents, and brokerage do not significantly affect company performance since the top contender in 2011 and 2012 has none. Based on our study, a successful e-business model does not have to include them all. The top three performing sites Realestate.yahoo.com, Realtor.com, and Zillow.com use the web-advertising model, which is the most successful model with respect to market share and revenue. In addition to using the web-advertising model, Realtor.com uses the brokerage model. Given that the other top contenders Zillow and Realestate.yahoo do not use the brokerage model suggests that it does not lead to competitive advantage. The six companies use the virtual value-chain as many products and services are digitized and available online. This includes photos, videos, online documents, and location maps. The use of the internet implies the use of the value-chain model. None of the six sites uses the diversified business model but Craigslist comes closest despite the lack of synergies between the various business areas of the company. However, the business areas are disjointed and this would disqualify Craigslist from being considered diversified if the strict definition of the diversified model is applied. It seems challenging to implement the diversified model in real estate because Federal and State laws prohibit certain business arrangements to avoid conflict of interest and collusion from occurring in an effort to protect consumers from fraud and reduced competition. We found evidence of hybrid internet models on display at the top three sites. Realtor.com e-business model uses web-advertising, brokerage, and virtual value-chain while Zillow and Yahoo use web-advertising and the virtual value-chain.

A contribution of this study is to identify the primary components of e-business models. This helps competitors identify similarities and differences between e-business model components. The study elucidates the strengths and weaknesses of

e-business models, allowing companies to improve performance and customer satisfaction. Because e-business models are vehicles for operationalizing a company's business strategy [21] and are extensions of the business, companies could use the information to better align the e-business model with the business strategy. Canvas Framework, due to the level of detail it affords, enables a level of analysis that would be impossible in its absence. It identifies additional components such as newness and customization that add value to customers. These important components would be ignored had we used a less comprehensive framework. By understanding the important components of an e-business model, companies are better equipped to focus attention on specific components. This includes adding, removing, or changing components to improve company performance and customer satisfaction. Since the real estate industry is experiencing hardship, knowledge and insight gained from this investigation could help companies improve their competitiveness and aid the recovery of the industry. Such insights are priceless to new entrants into the industry. Real estate sites are similar and different from non-real estate internet sites. E-business real estate sites are different because they act more like a virtual marketplace for stakeholders [25] (buyers, sellers, financiers, etc.), whereas most non-real estate sites facilitate buyer transactions between consumer and company where no third party is involved. Real estate sites are similar to eBay, which is considered an electronic marketplace. However, similarities exist between internet sites of non-real estate companies and those of real estate companies. First, both types of internet sites serve as extensions of the traditional business and so the traditional company business model and the e-business model should be aligned. Second, the primary objectives of an e-business model are to create value, deliver value to customers, and make a profit. These are identical to the objectives of any e-business regardless of industry. Therefore, the analysis pertaining to these aspects of our study is applicable to e-business models across industries.

A limitation of this research is that Canvas Framework does not place enough emphasis on business model management, continuous improvement, or business model governance. Consequently, we did not address them in our research, so expanding the study to include them is an avenue for future research. We tried to select a representative sample of real estate sites, but we recognize it is a small sample and this limits our ability to generalize the results. Therefore, we recommend a larger research study with a bigger sample size. We did not look at the alignment between the traditional business model and the e-business model of each company so this could be a future research study.

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