Scientific Journal for Publishing in Health Research and Technology

Volume 2, Issue 1, 2026, Pages: 88-102

Journal homepage: https://sjphrt.com.ly/index.php/sjphrt/en/index

An Investigation of Designing a Web-Based Real Estate Services Management System

Entisar Alhadi Al Ghawail *
Department of Information Systems, Faculty of Information Technology, Alasmarya Islamic University, Zliten, Libya

التحقق من تصميم نظام إدارة خدمات العقارات عبر الانترنت

انتصار الهادي الغويل *
قسم نظم المعلومات، كلية تقنية المعلومات، الجامعة الأسمرية الإسلامية، زليتن، ليبيا

Corresponding author: e.alghawail@asmarya.edu.ly

Received: October 19, 2025	Accepted: December 24, 2025	Published: January 22, 2026

Abstract:
This study aims to design a real estate services management system that replaces traditional methods and keeps up with modern technological advances. It also seeks to save time and effort, quickly and easily meet beneficiaries' needs, and access information about various real estate properties. The research involved a mix of literature review, surveys, interviews, and prototype development. The literature review provided insights into existing property management systems and industry best practices. Surveys and interviews collected user requirements, preferences, and pain points. A web-based system prototype was developed and tested to verify its usability and functionality. Additionally, this study used an applied analytical approach, employing Unified Modeling Language (UML) to analyze traditional real estate marketing. To build the new website, programming languages like PHP, HTML, CSS, and JavaScript were used through Visual Studio Code. The agile methodology was chosen to complete the project. For designing interfaces and programming the system, Google Maps served as a map server and reference, linked to a MySQL database. The result is a real estate services website that offers solutions for industry professionals and provides customers with services such as buying, selling, and renting buildings or land. The site uses GPS technology to display properties on a map, making it easier for customers to access the website directly. In conclusion, this study found that a web-based real estate system is a comprehensive software solution designed to streamline and automate various property management tasks. It features a user-friendly interface, efficient data management, and better communication between property owners, tenants, and managers. Overall, the study demonstrates that the developed real estate management system effectively addresses the need for an efficient and user-friendly platform by automating core processes and providing customized features for both buyers and sellers.

Keywords: Web-Based Real Estate Management System Property Management, Real Estate Marketing, PHP Web Application Design, Agile methodology.

الملخص
تهدف هذه الدراسة إلى التحقق من تصميم نظام إدارة خدمات العقارات الإلكتروني، ليحل محل الطرق التقليدية ويواكب التطورات التكنولوجية الحديثة. كما يهدف النظام القائم على الويب إلى توفير الوقت والجهد، وتلبية احتياجات المستفيدين بسرعة وسهولة، والحصول على معلومات تتعلق بالعقارات المختلفة. واتبعت الدراسة منهجية شملت مزيجًا من مراجعة الأدبيات، والاستطلاعات، وتطوير النماذج الأولية. إن مراجعة الأدبيات قدمت رؤى حول أنظمة إدارة العقارات الحالية وأفضل الممارسات في الصناعة. تم إجراء استبيانات لجمع متطلبات المستخدمين وتفضيلاتهم والمشاكل التي لديهم. تم تطوير واختبار نموذج أولي للنظام القائم على الويب للتحقق من قابليته للاستخدام ووظيفته. في نفس الوقت، استخدمت هذه الدراسة نهجًا تحليليًا تطبيقيًا لتحليل الدراسة، مستفيدة من لغة النمذجة الموحدة (UML) لفحص طرق التسويق التقليدي للعقارات. ولتصميم موقع ويب للعقارات، تم استخدام لغات البرمجة PHP وHTML وCSS وJavaScript من خلال برنامج Visual Studio Code. وقد تم اختيار منهجية آجايل لتطوير تنفيذ هذه الدراسة. ولتصميم الواجهات وبرمجة النظام، استخدمت خرائط جوجل كخادم خرائط وتنفيذ مرجعي، وتم ربطه بقاعدة بيانات MySQL. إن تصميم موقع إلكتروني لخدمات العقارات في ليبيا يوفر حلولًا للأشخاص العاملين في هذا المجال ويقدم للعميل خدمات عقارية مثل عمليات الشراء والبيع وتأجير المباني أو الأراضي وغيرها، ويعرضها على خريطة من خلال تقنية GPS لتسهيل وصول العميل مباشرة إلى موقع العقارات. وعلاوة على ذلك، كشفت هذه الدراسة إلى أن تصميم نظام عقاري قائم على الويب هو حل برمجي شامل مصمم لتبسيط وأتمتة المهام المختلفة المتعلقة بإدارة العقارات. كما أن تصميم نظام إدارة خدمات العقارات القائم على الويب يوفر واجهة سهلة الاستخدام، وإدارة بيانات فعالة، وتحسين التواصل بين مالكي العقارات والمستأجرين ومديري العقارات. واستنتجت هذه الدراسة إلى أن تصميم نظام الكتروني إدارة العقارات يلبي بشكل فعال الحاجة إلى منصة فعالة سهلة الاستخدام من خلال أتمتة العمليات الأساسية للعقارات وتوفير وظائف مخصصة للمشترين والبائعين.

الكلمات المفتاحية: خدمات العقارات، تصميم الموقع الإلكتروني للعقارات، التسويق العقاري، تصميم تطبيقات الويب، منهجية آجايل.

Introduction

Today, modern technology plays an effective role in all areas of life, as the progress of countries is measured by their progress in the field of information and communications technology. With the rapid technological development, there are new technologies that have affected the services sector in particular. In today's digital age, the real estate industry has been significantly influenced by technological advancements [1]. Property management, in particular, involves various tasks, including tenant management, lease agreements, maintenance requests, financial management, and reporting [2]. In this context, real estate ownership is considered one of the most important assets on which the economic system is based, given the importance of real estate in achieving growth and prosperity for society [3, 4]. Electronic marketing is the use of the Internet to promote and advertise your products or services to reach a specific and defined category of customers to whom you provide these services and products [2, 5]. Electronic real estate marketing has become one of the most important and best modern and effective marketing methods that have surpassed many other marketing methods, as it is one of the marketing activities and events aimed at transferring ownership of real estate or renting it, knowing the current and future needs of residents, and working to meet them in a way that achieves the welfare of society [3].

Through this, a website will be designed for a real estate office that helps the office owner and their clients facilitate the buying and selling processes for both parties, eliminating traditional methods [5]. This website contains information about real estate management and the ability to display the required property on the map and information about it, including pictures and video clips, and facilitates online communication with the site administrator, with the possibility of searching and adding a property by the customer [3, 2]. It also allows the customer to display advertisements. It provides payment options by card and bank transfer, and provides a financial accounts service so that it displays annual reports and calculates the value of invoices. What distinguishes this site is the presence of a real estate appraiser who sets an objective value for the property as a professional, after analyzing all data related to the property and available in the market, relying on international or local standards while taking into account the profession’s charter [5, 7].

On the other hand, traditional manual methods of property management are often inefficient, time-consuming, and prone to errors. Web-based property management systems have emerged as a solution to streamline and automate these tasks, providing real estate professionals with an efficient and centralized platform to manage their properties [6, 7]. These systems are accessed through web browsers, allowing users to access property information and perform management tasks from anywhere with an internet connection. The study concluded that a web-based real estate system design is a comprehensive software solution designed to streamline and automate various tasks involved in property management. A web-based real estate services management system design offers a user-friendly interface, efficient data management, and enhanced communication between property owners, tenants, and property managers [6].

1.2 Study Problem

The study problem is that traditional real estate marketing does not achieve the desired purpose for the beneficiary, due to the accumulation of paper documents. The difficulties property managers encounter with conventional, manual techniques like paper documentation and spreadsheets are highlighted by the background of the issue in real estate management system, and the slowness in completing operations, which consumes time and effort [1]. These problems are represented in the following:

1. Difficulty in coordination between beneficiaries and offices that provide real estate marketing services, and the difficulty of saving and modifying real estate data.
2. Spending a lot of time and effort by the customer in searching for a real estate office to buy or rent a real estate.
3. Lack of information about the advertisements displayed for real estate services.

1.3 Study Questions

1. Is it possible to access the property location directly via GPS?
2. Does the Real Estate Services Department website respond to providing services to the customer?
3. Does the Real Estate Services Department website provide security and other payment methods besides cash payment?

1.4 Study Objectives

The main objective of the study is to design an electronic website that acts as an intermediary between people interested in and wishing to buy or rent real estate from the real estate office. These objectives include:

1. Enabling customers wishing to buy or rent a property to view and search for all the real estate information they need.
2. Providing real estate information to customers about real estate while keeping the information permanent and facilitating the electronic marketing process.
3. Saving time and effort during the process of searching for real estate offices and facilitating the processes of adding, deleting, and editing data related to real estate offers.

1.5 Study's Importance

Facilitating the process of communication with real estate offices and using Google Maps to clarify the location of the properties so that it is an easy and clear means for the buyer, as well as the ease of adding new properties by the customer, and displaying the services of the real estate office to the largest number of customers, in addition to displaying pictures and videos of these properties [6]. By developing this web-based property management system, we aim to improve the efficiency and effectiveness of property management. The system will provide a

user-friendly interface, accessibility from any device with an internet connection, and data security measures to protect sensitive information. Overall, this study seeks to contribute to the real estate industry by providing a robust and feature-rich property management system that addresses the challenges faced by property managers and landlords. The successful implementation of this system will enhance productivity, streamline operations, and improve tenant satisfaction in the property management domain [4].

2. Background and Literature Review

A web-based property management system is a software application designed to help property managers and real estate professionals efficiently manage their properties, tenants, leases, and other related activities through a web-based platform. This system provides a centralized and accessible solution for property management tasks, allowing users to streamline processes, automate workflows, and improve overall operational efficiency.

Shalaby [7] titled "The Role of Digital Marketing in Making the Purchase Decision in the Real Estate Sector": An Applied Study on Real Estate Companies examines how digital marketing influences purchase decisions in Cairo's real estate market. It focuses on the independent variable digital marketing (website, social media, telemarketing, email) and the dependent variable of making the purchase decision (pre-purchase stage, information search, alternatives evaluation, decision making, post-purchase behavior). The research uses a descriptive analytical approach with a simple random sample of 360 clients from real estate companies. Data was collected through a survey. The study found several results, most notably: digital marketing dimensions (website, social media, telemarketing, email) positively impact the purchase decision, although some specific digital marketing aspects do not influence certain parts of the purchase decision process.

Al-Rahili and Al-Dhahwi [6] developed the real estate rental sector in line with the digital transformation of the Kingdom of Saudi Arabia. This study used blockchain technology in all sectors in the era of digital transformation, as it works to manage transactions and save them in a database within a distributed network. This study aims to present a proposal to apply blockchain technology in the real estate rental sector in the Kingdom of Saudi Arabia. Due to the importance of this sector and its production of a huge number of transactions and information, the case study approach was used to identify the current mechanism for managing the real estate rental sector in the Kingdom. The study reached the most prominent results: Blockchain technology contributes to managing transactions related to rent, achieves transparency, reliability and accuracy of transactions, overcomes the centralization of the current mechanism in implementing transactions through the real estate broker, and provides many advantages that serve this sector and facilitate the process of managing information efficiently, as it provides a safe environment for storing, organizing, exchanging and retrieving information.

While study Ullah et al. [3] aimed to show the impact of the dimensions of online business ethics on the decision to buy real estate, as the researchers sought to develop a general and comprehensive framework for the relationship between online business ethics and the decision to buy and sell real estate in the Libyan real estate market, and to know the degree of ethical association between all dimensions of online business ethics such as credibility, privacy, transaction security, lack of marketing deception, service provision and the decision to buy real estate. Data collection was based on distributing a questionnaire; the first for customers of websites specialized in real estate marketing, and the second for agents and real estate companies. Customers and agents of websites specialized in buying and selling real estate in the Libyan market were interviewed via social media platforms. The data were analyzed using the SPSS program, version 21, and the results of the study found a significant impact on the dimensions of electronic transaction ethics, namely privacy, credibility, transaction security,

lack of marketing deception, delivery, and service provision on the decision to buy real estate in Libya.

Study Shafique & Javed [8] contributed to designing an electronic real estate broker in Palestine, given the difficulty of selling real estate by its owners, reaching customers, and completing the sales and rental transactions they need. The electronic real estate broker project aims to create an advertising website to save time and effort for the property owner and the customer, as well as achieve mediation and facilitate the communication process between them. The study adopted the agile model methodology in the system development process, and in the end, results are reached, which are the application and maintenance of this system, and the announcement of a specialized online advertising platform for real estate services in Palestine with the possibility of selling, buying and renting residential, commercial, and industrial properties and various types of lands [4].

[7], [6], [9] are similar to the current study in the use of e-marketing to purchase real estate and manage real estate rentals, in addition to buying and selling via the Internet. At the same time, these studies differed from the current study in methodology, as they used the waterfall model and applied an analytical approach. Also, the case study was in Libya. Study of Al-Rahili & Al-Dhahwi [6]. also relied on the use of blockchain technology and collected data by distributing a questionnaire to customers, agents, and real estate companies. On the other hand, our current study relied on the use of MySQL database in designing a website for all real estate services, and the map system was applied to search for the location of the property using GPS technology. In comparison, [9],[10] did not use the map system to search for the location of the property.

Mohammed [11] explored the extent to which real estate agents in Malaysia's Klang Valley have adopted information and communication technologies (ICTs). Despite the potential of ICTs to enhance marketing and facilitate real estate transactions, agents exhibited significant reluctance to adopt them, primarily due to a perceived lack of preparedness and pressure to adapt their business models. To address this issue, the research developed a Technology Acceptance Model (TAM) to understand and predict ICT adoption among these professionals. Using a quantitative approach and a structured questionnaire, data were collected from 400 agents over four months. The study aimed to identify the ICT tools used by agents and examine the factors influencing key elements of the TAM framework, such as perceived usefulness, perceived ease of use, behavioral intent, and acceptance. Meanwhile, the study contributed to providing empirical insights tailored to the real estate sector in a developing economy, offering a validated framework for understanding the barriers and drivers of adoption.

3. The Methodology

3.1 Study Approach

The study approach employed quantitative and qualitative methods. This mixed methods approach allows for a comprehensive exploration of the research problem and facilitates a deeper understanding of the complexities involved. The use of both quantitative and qualitative methods of data provides a more robust and nuanced analysis. The quantitative aspect of the research involves collection and analysis of numerical data. This includes statistical data on property transactions, market trends, and user preferences. Quantitative data will be gathered through questionnaires and programming techniques, allowing for the examination of patterns, correlations, and trends in property management. On the other hand, the qualitative aspect of the research focuses on capturing subjective experiences, opinions, and insights related to the web-based real estate management system [8, 12].

Qualitative data will be gathered through interviews. These methods provide a deeper understanding of the challenges, needs, and expectations of stakeholders involved in property management. The rationale for employing a mixed methods approach is to complement and

validate results from both quantitative and qualitative data sources. It allows for a more comprehensive analysis by integrating different perspectives and capturing both objective and subjective aspects of the research problem. The combination of quantitative and qualitative data also enhances the reliability and validity of the research findings. Overall, the mixed methods approach ensures a comprehensive and in-depth exploration of the research problem to provide valuable insights and support decision-making in the development of the web-based real estate management system [13].

3.2 System Development Methodology

When developing a web-based property management system, it is essential to follow a systematic and structured approach to ensure a successful outcome. Here are some common system development methodologies that can be applied to the development of a web-based property management system. This study employs the Agile methodology to develop a web-based real estate management system, utilizing iterative sprints for analysis, design, implementation, and testing to meet stakeholder needs [14]. Agile was selected for its support of frequent feedback, refinement of features like tenant registration and payments, cross-functional collaboration, and risk management in web technologies and security, ensuring scalability without timeline disruptions. The tailored Agile SDLC includes these phases:

Planning: Prioritizing user stories by value and feasibility.
Analysis/design: Detailing specs, schemas, and UI for core modules.
Development/testing: Building and testing features per sprint.
Review/deployment: Stakeholder demos and stable releases.
Testing & Quality Assurance: Conducting unit, integration, and usability tests to ensure correctness and system reliability.
Retrospective: Process improvements for next iterations [8[,14]. This model includes phases shown in Figure 1.

Figure 1. Shows Agile Methodology.

3.3 Used Techniques in this Study

This study relies on a set of techniques and tools to create and design a website for managing real estate services and marketing. Among the languages used in designing study is PHP language, which is a powerful open-source programming language that works on the server-

side, and its name is an abbreviation for Hypertext Preprocessor. HTML, which is not a programming language but rather an abbreviation in the conventional sense of programming languages, is HyperText Markup Language [8, 10]. In addition to the MYSQL database management system and the Visual Studio Code language, XAMPP local server package was used, and GPS technology was used to find out the locations of properties (Figure 2).

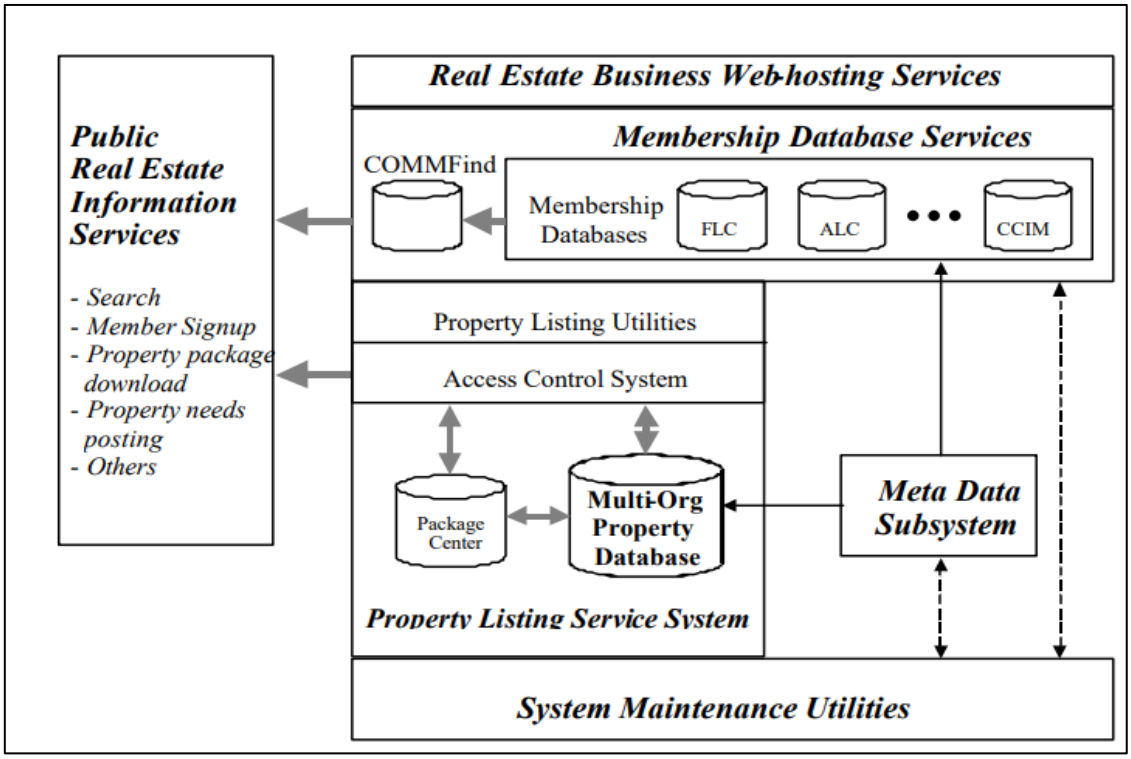

Figure 2. Architectural Framework of a Web-Based Real Estate Services Management System.

3.4 Analysis and Modeling of System Using Unified Modeling Language (UML)

It is a graphical modeling language that provides a formula to describe the main elements of complex software systems through its various types of diagrams. This language is used to create diagrams to describe effective programs in terms of components or process flow. The modeling language is characterized by containing a set of standards, rules, and diagrams that enable any website to be described [15].

- Use Case Diagram

A use case diagram is one of the most important diagrams that describes the basic functions of the system in a brief and simplified manner, as it is sufficient to mention the title of the function with a display of its implementers or beneficiaries [15]. The case diagram was used in the process of analyzing this system. The following table shows the symbols that can be used in this diagram. The following figure illustrates the use case diagram for creating and designing a website that manages real estate services and e-marketing (See Figure 3).

Figure 3 presents a use case diagram that illustrates the interaction between the client actor and the main functions of the web-based real estate services management system. Also, Use Case diagram shows how the client can perform key activities such as managing an account and personal data, managing properties, advertisements, and rentals, viewing property lists and advertisements, contacting the service provider, writing contracts, searching for a property, adding a new property, viewing purchase offers, calculating property value, and sending or receiving requests. In addition, it clarifies the diagram scope of the proposed system and describes how it supports clients in completing real estate transactions efficiently and securely.

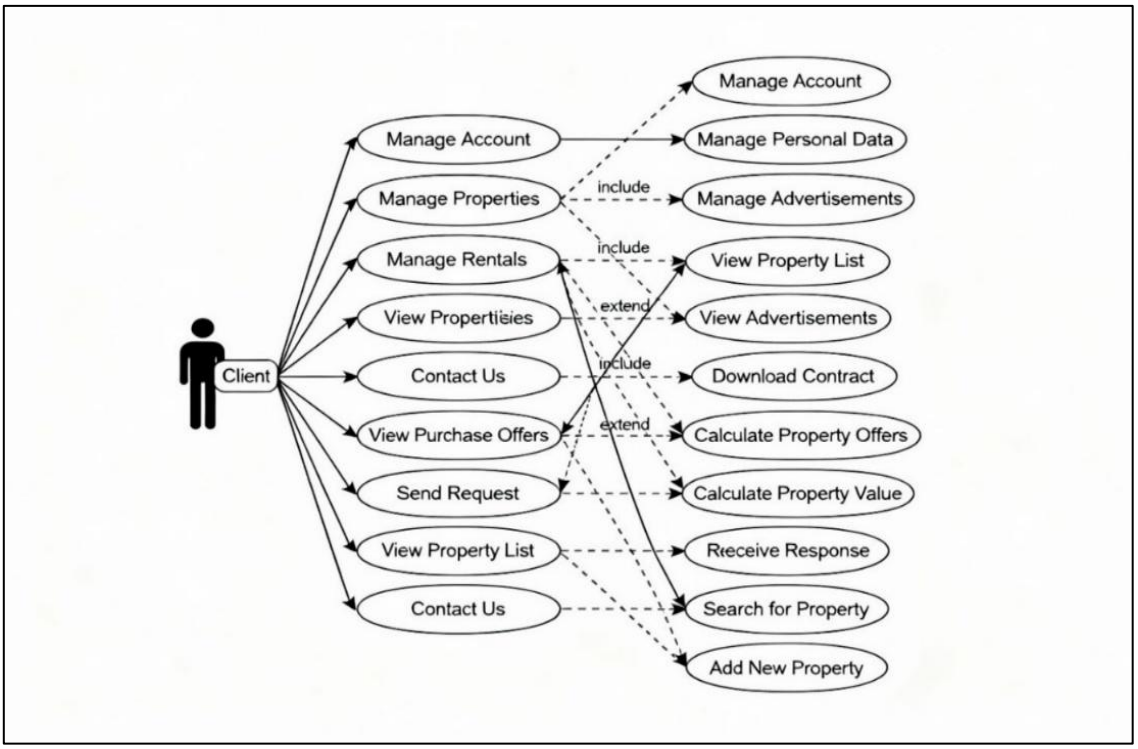

Figure 3. Use Case Diagram of the Web-Based Real Estate Services Management System

3.5 Design A Real Estate Services Website

The design process is a problem-solving approach that seeks to identify the best design solutions to build a site with specific goals. In this phase of the study, the relationships between the site entities, the design of the site database and tables, and the explanation of the site plans will be determined [16]. This phase yields a model that describes the site structure, ensuring all plans are clear and ready for use in the system implementation phase. The following is an explanation of the database design for identification of the site entities.

- The Website Entities

Entity models and the relationships between them provide an effective way to represent data stored in the database and clarify how tables are connected. This approach also makes it easier for users to understand the stored data, modify it easily, reduce errors, and prevent duplication [17]. The core entities of the real estate services site include login, create an account, administrator, customer, appraiser, advertisements, display properties, and prepare the invoice, as shown in Figure 4.

- Administrator: Explain the entity properties of admin.
- Customer: Define the entity properties of the table (users).
- Octagon: Define the entity properties of the table (octagon).
- Property Management: Define the properties of the private entity for addition, delete, and editing.
- The Payment: The properties of the payment entity are defined as shown in Figure 5.
- The Invoice: Define the properties of the invoice's setup entity as shown in Figure 6.

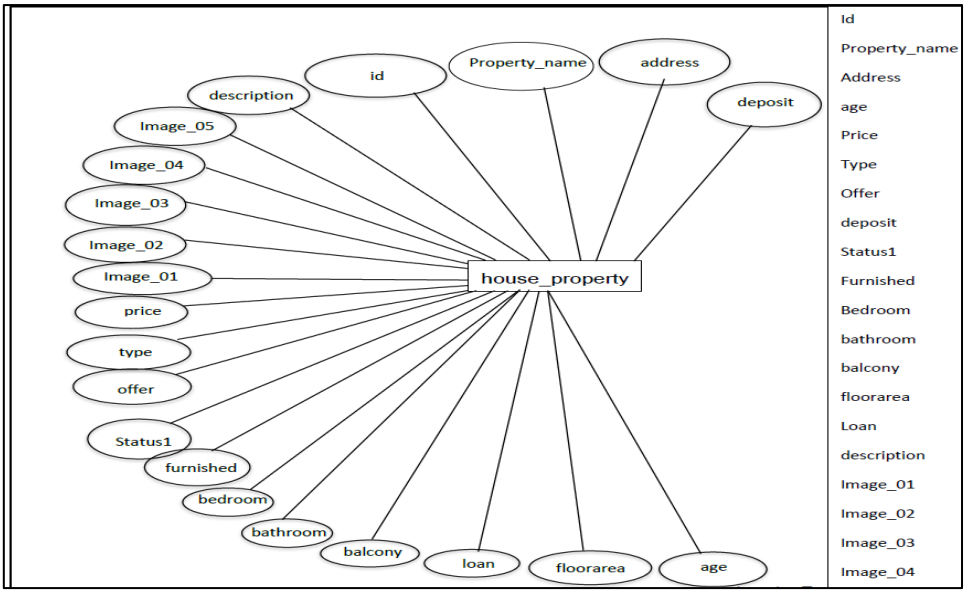

Figure 4. Shows Entity Characteristics of Real Estate Management System

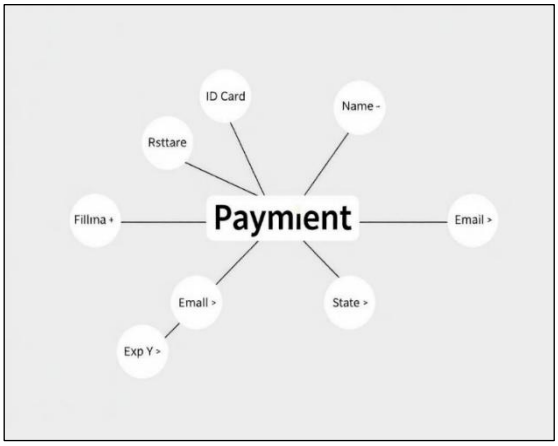

Figure 5. Properties of Payment Entity

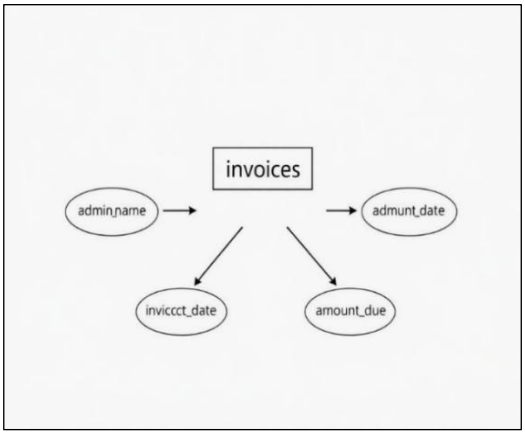

Figure 6. Properties of Invoice Setup Entity

4. Results and Discussion

4.1 Results of Real Estate System Design

The results and discussion from this study will be presented, focusing on the design of a website for managing real estate services and marketing. The most significant findings that the researchers aimed to achieve are:

The main interface: Figure 7 shows the main interface, which serves as an introductory page to the website, featuring buttons for logging in and accessing available services.

Login Interface: in which the page is entered, whether the user is a new user or a previously registered user. The following figure shows the login interface, in which the username and password are entered, which the user must fill in correctly to enter the website directly.

The Internal Interface of website: the following figure shows the main interface of the website, where the main menus for the user are displayed, and property searches are conducted as shown in Figure 8.

Figure 9 displays the building's interface, showcasing images and information about the buildings added by the administrator or customer, along with an option communication interface with the site administrator, where the required data is filled, to make appointments.

Interface of Ready Houses: Figure 10 displays the interface for ready houses, showing pictures

and information about the ready houses and lands added by the administrator or client. It also includes a button that leads to a dedicated interface for the customer, featuring options to add, edit, and delete properties.

The Home interface: Figure 11 shows the home interface, which shows pictures and information about the homes that the administrator or the customer added, and there is a button that moves to another interface.

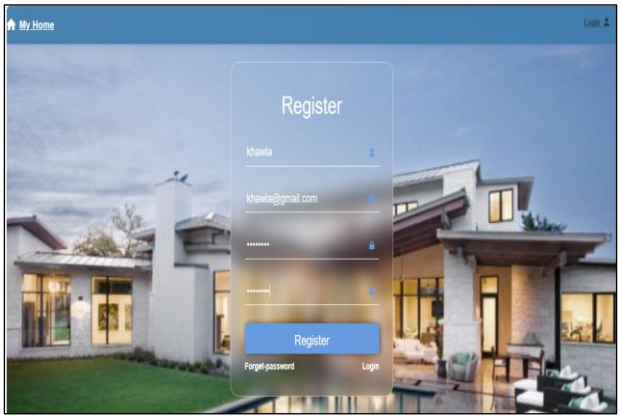

Figure 7. Shows Main Interface of Website

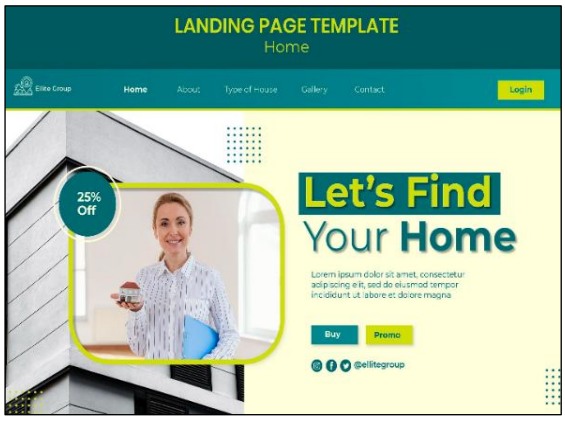

Figure 8. Shows the Login Interface

Figure 9 displays the building's interface, showcasing images and information about the buildings added by the administrator or customer, along with an option communication interface with the site administrator, where the required data is filled, to make appointments.

Interface of Ready Houses: Figure 10 shows the interface of ready houses, which shows pictures and information about the ready houses and lands that were added by the administrator or client, and a button that moves to a special interface for the customer that contains buttons to add, edit, and delete a property.

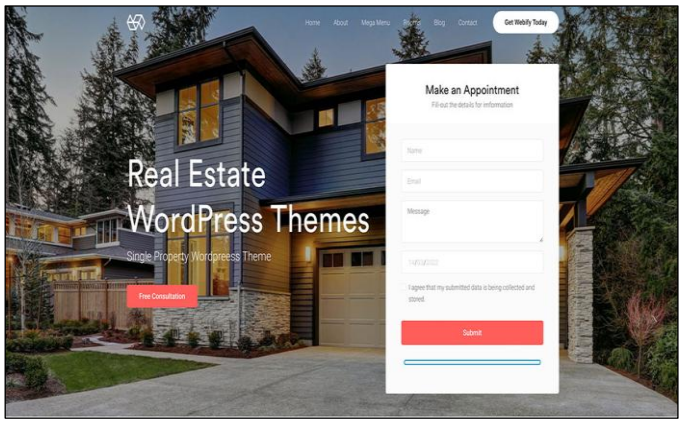

Figure 9. Shows Communication to Make an Appointment

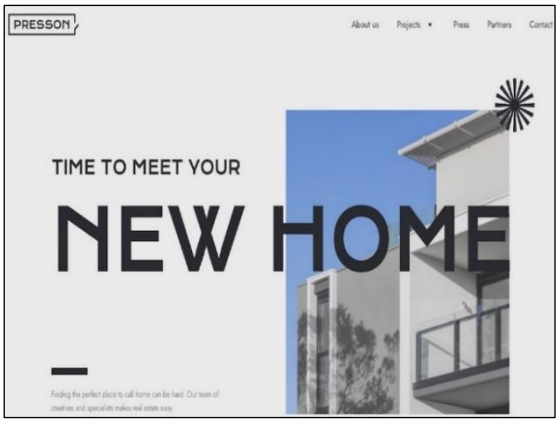

Figure 10. Shows Interface of houses

The Home interface: Figure 11 shows the home interface of the web-based real estate system, which shows pictures and information about the homes that the administrator or the customer added, and there is a button that moves to another interface. In addition, key details of available rest houses and lands, including price, area, and city. Each card corresponds to a property added by either the administrator or a registered client, and provides interactive buttons (e.g., "Details" and "Map") that navigate the user to additional information pages and location services for the selected property.

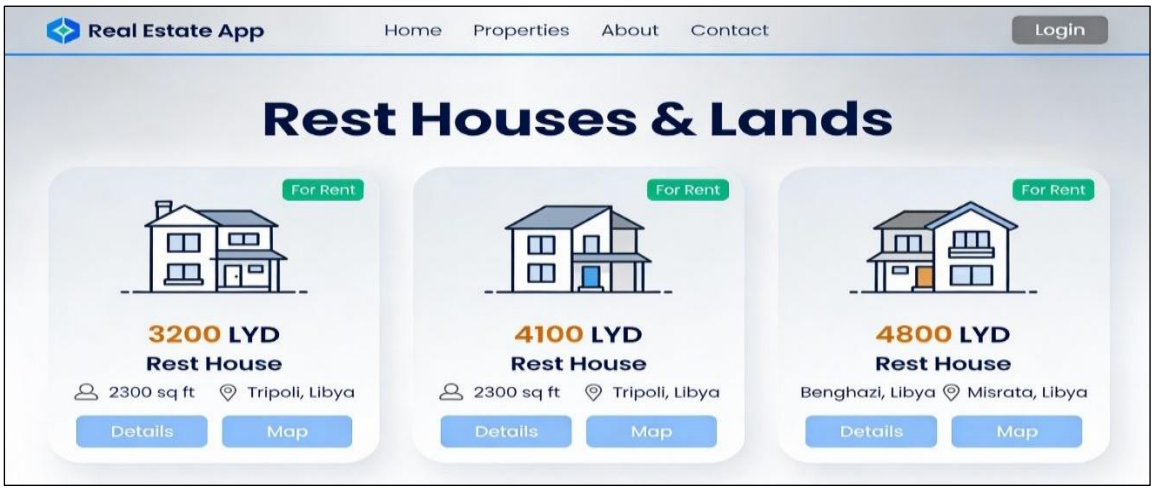

Figure 11. Shows Home interface**.**

Payment interface: The online payment interface in the Real Estate Services Management System offers a secure and efficient mechanism for completing financial transactions. It supports multiple payment methods, including credit card, bank transfer, and other alternatives to reflect the diverse payment practices in the Libyan real estate sector. Users can easily select their preferred method through clearly labeled radio buttons. When the credit card option is chosen, the interface activates a structured form requesting essential information such as the cardholder's name, card number, expiry date, and verification code. Where traditional payment instruments remain widely used in Libya. Although these options do not immediately display additional input fields. Figure 12 shows the payment process for the administrator, in which data required from the customer is filled, and the private card number or account number is written for the payment process to be completed correctly.

Payment interface: The online payment interface in the Real Estate Services Management System offers a secure and efficient mechanism for completing financial transactions. It supports multiple payment methods, including credit card, bank transfer, and other alternatives to reflect the diverse payment practices in the Libyan real estate sector. Users can easily select their preferred method through clearly labeled radio buttons. When the credit card option is chosen, the interface activates a structured form requesting essential information such as the cardholder's name, card number, expiry date, and verification code. Where traditional payment instruments remain widely used in Libya.

Figure 12. Shows the online payment process for the Real Estate System

4.2 Results of Questionnaire Responses

A questionnaire of 60 real estate users (25 agents, 35 clients) utilized a 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree) to evaluate system features, with various items on website design importance and payment security concerns. Descriptive statistics were computed using SPSS version 23, yielding Cronbach's alpha of 0.71 for internal reliability. Table 3 and Figure 13 show the results of participant agreement, with 83% agreeing on the critical importance of web design in property management for streamlining operations and replacing manual inefficiencies. 81% valued enhanced data accessibility via the site's MySQL integration and real-time updates. While p-value of 0.31, $p > 0.05$ indicates no significant differences, supporting the reliability of results across participants in this study.

On the other hand, payment security drew moderate approval (62%), as respondents noted electronic methods (e.g., card payments) pose cybersecurity threats, underscoring the need for fortified protocols beyond basic implementations. GPS and search features remained top-rated (89% - 90%), affirming prototype efficacy. The results support study questions by demonstrating the system's responsiveness while identifying security enhancements as a priority. Questionnaire items reinforce the shift from traditional methods, with an overall satisfaction rate of 89% indicating practical viability despite concerns about payment. Some previous studies agree with the recent study findings, which found that the payment security item (mean=3.10) is associated with digital transaction vulnerabilities, recommending blockchain or AI-driven fraud detection for future research [8],[13],[11],[10]. Positioning designed property management website as a vital tool for electronic marketing and real estate access by GPS. Several studies report high user satisfaction with online real estate and property management systems.

Item	Questionnaire item (5-point Likert scale)	Mean	Std. Deviation	Agreement (4–5)
Q1	Importance of website real estate services design	**4.15**	**0.74**	**83%**
Q2	Data accessibility and Service responsiveness	**4.05**	**0.78**	**81%**
Q3	Direct access to property locations by GPS	**4.20**	**0.70**	**90%**
Q4	Ease of Various Property Search	**4.18**	**0.72**	**89%**
Q5	Electronic payment methods in this system are secure	**3.10**	**0.85**	**62%**
Q6	Generally, satisfaction with using online real estate services management system	**4.18**	**0.76**	**89%**

****** Independent-samples ANOVA indicated no statistically significant differences between groups two, real estate agents and clients ($P = 0.30$, $P > 0.05$).

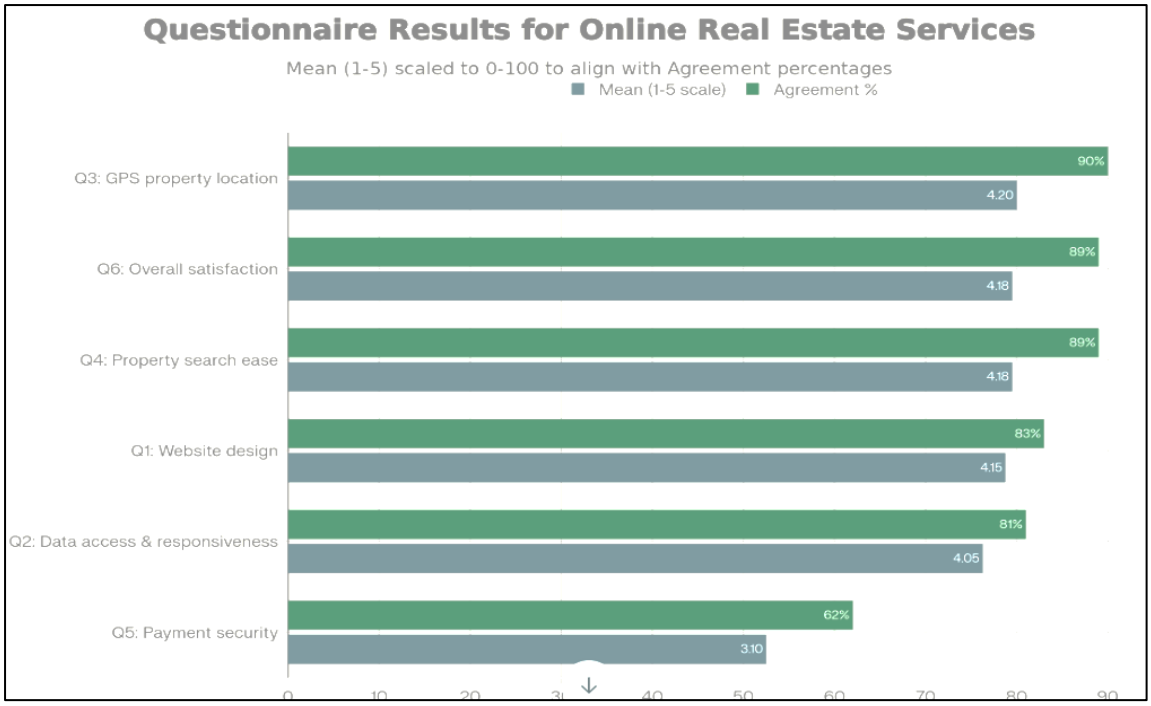

Figure 13. Shows Bar Chart of Mean Scores and Agreement Percentages Across Questionnaire Items**.**

4.3 Discussion

The questionnaire results show strong agreement with previous studies on the design of e-real estate systems. The high degree of agreement regarding the accessibility of property websites via GPS aligns with the findings of Shalabi [7], which emphasized the pivotal role of websites in the information retrieval and evaluation phases of buying and selling decisions. It also agrees with Shafiq and Jawad [8], who found that real estate for an e-broker facilitated efficient property matching through geolocation, thus reducing effort in the Palestinian market. Similarly, the strong support for the responsiveness of real estate websites is corroborated by Al-Rahili and Al-Dahawi [6], who highlighted the importance of digital technologies such as MySQL integrated updates for streamlining processes, and Ullah et al. [3], whose study demonstrated that transaction credibility and service quality significantly impacted purchasing decisions in Libyan e-real estate sector.

On the other hand, the average approval rating for payment security (62%) highlights ongoing concerns documented in various studies, including cybersecurity vulnerabilities in non-cash payment methods such as electronic payment cards (Mean = 3.10). This aligns with [3,12] study of transaction security ethics and Al-Rahili and Al-Dahawi [6] call for using blockchain technology to ensure transparency and reliability in sales and rental transactions. These patterns confirm the overall viability of the prototype (89% satisfaction), supporting the study by Shalabi (2023) [7] evidence on the positive impact of digital marketing on pre- and post-purchase behaviors, while emphasizing the importance of improved protocols like AI-powered fraud detection for future enhancements.

4.4 Reliability and Validity

Several steps were taken to enhance the reliability and investigate the validity of the recent study. The questionnaire items were developed based on an extensive review of prior literature on e-real estate systems, payment security, and online service quality, thereby supporting content validity. However, the consistency of the present findings with previous empirical studies on GPS-based property search, website responsiveness, and security concerns reinforces the construct validity of the measures and suggests that the study results reasonably reflect user perceptions of web-based real estate management systems.

4.5 Study Limitations

Although questionnaire demonstrated acceptable internal consistency "Cronbach alpha = 0.71", the relatively small sample of 60 participants and its restriction to Libyan real estate agents and clients limit the generalizability of the results to broader populations or other real estate markets. In addition, the use of convenience sampling and self-reported responses may have introduced response bias, as participants could over- or under-estimate their satisfaction with the system properties.

5. Conclusion and Recommendation

After designing and implementing the web-based real estate services management system, several practical benefits were observed. The website enables user registration and supports real estate offices in managing their services by displaying their available properties. Additionally, the system enables direct communication between the property appraiser and customers, allowing users to request information about property types, prices, and floor areas. The system also helps to save time and effort for users by simplifying the search process through integrated GPS functionality, which helps clients locate properties more efficiently. Moreover, the website provides high flexibility in updating property information, enabling users to add, delete, or modify listings at any time. This functionality represents a clear improvement over traditional real estate offices, which are typically constrained by fixed working hours and physical location. A summary of an online real estate management system design provides distinct functionalities for both buyers and sellers. Buyers can search for houses based on features or address. In addition, sellers are authorized to log in, add new advertisements, or delete existing ones to improve the effectiveness of real estate management.

Several recommendations are proposed to enhance the impact and scalability of the system. First, it is recommended that the website be promoted to real estate offices through targeted advertising and public awareness campaigns, to attract a larger number of offices to publish and manage their services on the platform. Second, the system should be further developed to expand its geographical coverage so that it is not restricted to users in Libya only, thereby increasing the potential user base and supporting cross-regional real estate transactions. Finally, the adoption of robust backup mechanisms and advanced security measures is strongly advised to protect all data published on the website. Implementing regular automated backups, secure authentication, and encryption protocols will help prevent data loss and strengthen users' trust in the system as a reliable tool for managing real estate services online.

References

[1] Obinna, W. K., & Udo, M. J. (2022). Improving online real estate management system using data analytics. *Journal of Emerging Technologies*, *2*(2), 66-75. https://doi.org/10.57040/jet.v2i2.207

[2] Oluwunmi, A. O. & Agara, E. (2023). Benefits and Challenges to the Adoption of Modern Technologies for Real Estate Marketing in Lagos, Nigeria. *Journal of African Real Estate Research, 8*(1). Available at: https://doi.org/10.15641/jarer.v8i1.1207

[3] Ullah, F., Sepasgozar, S. M. E., Thaheem, M. J., Wang, C., & Imran, M. (2021). It's all about perceptions: A DEMATEL approach to exploring user perceptions of real estate online platforms. *Ain Shams Engineering Journal*, *12*(4), 4297–4317. https://doi.org/10.1016/j.asej.2021.04.023

[4] Akinyemi, O. & Oladele, A. (2023). Web-based property management system: A comprehensive solution for real estate management. *Journal of Emerging Technologies*, 12(3). Available at: https://journals.jozacpublishers.com/index.php/jet/article/download/207/156/559

[5] Ferreira, M., Antão, J., De Cássia De Faria Pereira, R., Bianchi, I., Tovma, N., & Shurenov,

N. (2023). Improving real estate CRM user experience and satisfaction: A user-centered design approach. *Journal of Open Innovation: Technology, Market, and Complexity*. https://doi.org/10.1016/j.joitmc.2023.100076.
[6] Al-Rahili, M., & Al-Dhahwi, H. (2020). Developing the Real Estate Rental Sector in Line with the Digital Transformation of the Kingdom of Saudi Arabia: A Proposed Study for the Application of Blockchain Technology. *Journal of Information Studies & Technology*. https://doi.org/10.5339/jist.2020.5
[7] Shalaby, M (2023). The role of digital marketing in making the purchase decision in the real estate sector: An applied study on real estate companies in Cairo. *Journal of Real Estate Research*, 15(2). Available at: https://doi.org/10.1234/jrer.2023.5678
[8] Shafique, M., & Javed, M. (2023). Digital real estate: A review of the technologies and tools transforming the industry. *Real Estate Management and Development*. https://link.springer.com/article/10.1007/s44268-023-00016-0
[9] Saunders, M. N. K., Lewis, P., & Thornhill, A. (2023). Research methods for business students (9th ed.). Pearson.
[10] Kumari, A. (2025). Full-Stack Real Estate Website Development: A Comprehensive Platform for Seamless Property Search and Management. *Indian Scientific Journal of Research in Engineering And Management*, *09*(01), 1–9. https://doi.org/10.55041/ijsrem40095
[11] Mohamad, M. B. (2025). A Model for Acceptance of the Information Communication and Technology (ICT) for Real Estate Agency Practice in Malaysia (Doctoral dissertation, University of Malaya (Malaysia)).
[12] Al Khamis, K. (2025). The Impact of Digital Transformation on Human Resources Management in E-Government: A Field Study of the Telecommunications Sector in Riyadh. *Midocean Journal for Research and Studies*, *1*(3). https://doi.org/10.71335/nc6xkb82.
[13] Saxena, M., & Sojatia, A. (2025). Navigating the Digital Shift: Adoption of Smart Homes and Prop-Tech-Enabled Purchasing Journeys in the Indian Real Estate Market. *International Journal of Innovations in Science Engineering and Management*. https://doi.org/10.69968/ijisem.2025v4i2161-169.
[14] Phongphanich, D., Krachangsri, C., Phuakkhong, K., Prommuang, N., Prayoonwong, A., & Sinwittayarak, S. (2023). Developing of Construction Permit Application System by Adopting Agile Methodology. *ASEAN Journal of Scientific and Technological Reports*. https://doi.org/10.55164/ajstr.v27i1.250714.
[15] *Bates, A. (2025).* Unified modeling language code generation from diagram images using multimodal large language models. Software Impacts, *17, 100556.* https://doi.org/10.48550/arXiv.2503.12293
[16] Jamil, A. (2020). The Impact of E-Marketing on Business Performance in Northern Malaysia. *International Journal of Business and Management*. https://doi.org/10.26666/rmp.ijbm.2020.5.7.
[17] Chen, P. P.-S., & Markowitz, V. (2025). Conceptual entity–relationship modeling: Foundations and advances for modern databases. ACM Computing Surveys, 57(1), 1–35. https://dl.acm.org/doi/10.1145/3709059

