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SCALABILITY AND SUSTAINABILITY IN THE CONSTRUCTION OF A SOCIAL SPORTS MANAGEMENT INFORMATION PLATFORM BASED ON WEB TECHNOLOGY

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Abstract. Scalability and Sustainability are a major traits that a website requires. Moreover, in Social sports management, information platforms must be reliable. Thus, different tools for developing a platform based on web technology are discussed in an empirical study for the purposes mentioned earlier. For the study, secondary data was analyzed, and qualitative methods were used. In addition, it was noticed that there are some problems related to a web technology-based platform. It was found that an improved development strategy in the beginning aids in traffic management. In addition, an improved tech stack is directly related to the data analysis process of a sports management system. A lack of such factors in the construction process reduced the scalability and sustainability of a social sports management information platform. Thus, a complete discussion aimed at understanding the sustainability and scalability of a web management platform is done.

Key words: Web technology, components of Web technology, frontend development, Backend development, Scalable website

1. Introduction. The incorporation of technology in a web-based platform decreases the hassle of looking for information. In addition, including a quality data management system helps manage all the essential aspects of sports management. Furthermore, including data modeling in a web-based platform ensures the reliability of the information [1]. Managing events through the analysis of historical data is one of the significant aspects of such a platform. However, the sustainability of web-based platforms might be an issue as a huge amount of data is processed in such models. Therefore, the following empirical study aims to understand and sustain a Social Sports Management Information Platform based on web technology [2]. In addition, the scalability of a web-based model is one of the primary concerns of the following study.

Figure 1.1 of the analysis related to the Stability of a scalpel website. During the analysis of past literature, it was noticed that including different analytical models in websites increases the load on a web platform [3]. Therefore, such construction of a web technology-based information system faces an issue of reduced sustainability. Moreover, handling a vast amount of data is compromised due to significant traffic. Thus, the construction of a web technology-based model is analyzed according to the collected data. In addition, all the necessary factors are analyzed for a better perspective of constructing a web technology-based platform. Further inclusion or relatable objectives in the study are a backbone for the empirical study [9]. Following the objections, a qualitative analysis was possible that helped to conduct systemic research. Including a problem statement is there, that helped to reflect an overall knowledge of the study's findings.

Web technology refers to the tools, technologies, and protocols used for building and accessing web-based applications and services over the Internet. It encompasses many components that enable the creation, delivery, and interaction of web content. Here are the main technical details that define web technology:

HyperText Markup Language (HTML): HTML is the standard markup language used to create the structure and content of web pages. It defines the elements, layout, and formatting of web content, including text, images, links, and multimedia.

Cascading Style Sheets (CSS): CSS is a stylesheet language used to control the presentation and styling of HTML elements. It allows designers to specify how the content should be displayed, including layout, colors, fonts, and responsive design for different devices.

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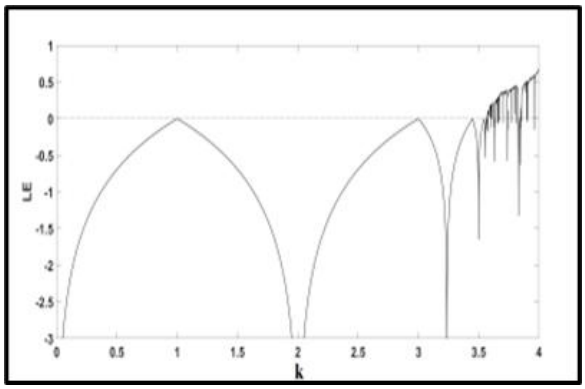

Fig. 1.1: Graph Explaining Stability In a Website

JavaScript: JavaScript is a powerful scripting language in web browsers. It adds interactivity and dynamic behavior to web pages, enabling actions like form validation, animations, and real-time updates without page reloading.

Web Servers: Web servers handle HTTP requests and serve web pages to clients (usually web browsers). Popular web server software includes Apache, Nginx, and Microsoft IIS. These servers host the web application files and deliver them to users.

HTTP (Hypertext Transfer Protocol): HTTP is the fundamental protocol used for communication between web clients (such as browsers) and web servers. It defines how requests and responses should be structured, allowing the exchange of HTML documents, images, scripts, and other resources.

Backend Development: Backend technologies handle server-side logic, data processing, and database interaction. Common backend languages include JavaScript (Node.js), Python (Django, Flask), Ruby (Ruby on Rails), Java (Spring Boot), and PHP. Backend frameworks streamline the development of server-side functionality.

Database Management: Databases store and manage structured data web applications use. SQL (Structured Query Language) databases like MySQL, PostgreSQL, and NoSQL databases like MongoDB are commonly used. Databases allow for efficient data retrieval, storage, and management.

APIs (Application Programming Interfaces): APIs enable different software components (including web applications) to communicate with each other. Web APIs, often built using REST (Representational State Transfer) principles, allow developers to access specific functionalities or data from external services.

Web Application Frameworks: These software frameworks provide a structured way to build web applications. They often include tools, libraries, and pre-built components to simplify everyday tasks, enhance security, and improve efficiency.

Web Security: Web technologies incorporate security measures to protect users' data and ensure the integrity of web applications. Techniques include HTTPS (secure version of HTTP), encryption, authentication, and authorization mechanisms. .

2. Objectives. To develop an empirical study in a systemic manner, having a pre-determined path is essential. Thus, the following objectives are created for studying the world as the backbone of the qualitative analysis.

1. To understand the working process of web technology-based platforms;
2. To understand the factors that are essential for web technology-based platforms;
3. To discuss the algorithm-based model to understand the proceeding of sports management;
4. To observe the factors impacting the process of web technology-based construction;
5. To elaborate on the problems of web technology-based platforms that are impacting sustainability and scalability.

3. Methodology. The development of a study methodology plays an important part. Moreover, the methodology of a study undertakes all the steps essential for reaching a conclusive result [11]. Therefore, for the constructive and systemic development of the study, the qualitative method of research was considered. Furthermore, secondary data was considered during the process of data collection. Secondary data is reliable and a pre-verified piece of information [8]. Hence, with the inclusion of secondary data for the research, the researcher was able to produce a reliable study with authentic data. In addition, quantitative analysis was most reasonable for developing a conclusive outcome of the analysis. The qualitative process of analyzing data looks into different relations between factors [14]. In addition, qualitative analysis aids the process of reducing unrelated factors. Hence, for the reasons above, qualitative data was considered for the empirical study.

In a social sports management information platform based on web technology, several existing problems can arise that impact its effectiveness and efficiency. These problems may include:

1. **User Experience and Interface Design**: The platform's user interface and experience might not be intuitive or user-friendly, leading to difficulty navigating, accessing information, and performing tasks.
2. **Scalability Challenges**: As the platform gains popularity, it might struggle to handle a large number of users and data, leading to slow performance, crashes, or downtime during peak usage periods.
3. **Data Security and Privacy**: Protecting sensitive user data, such as personal information and payment details, from cyber threats and unauthorized access could be a significant challenge.
4. **Integration of Features**: Integrating various features like event scheduling, participant registration, payment processing, and performance tracking seamlessly can be complex and prone to glitches.
5. **Technical Compatibility**: The platform might not work well across different devices, browsers, or screen sizes, potentially limiting its accessibility for a diverse user base.
6. **Reliability and Uptime**: Ensuring the platform's availability 24/7 without disruptions or downtime is crucial for maintaining user trust and satisfaction.
7. **Content Management and Updates**: Managing and updating content, such as game schedules, news, and announcements, in a timely and accurate manner can be challenging.
8. **Community Engagement**: Encouraging active participation and engagement from users, such as players, coaches, and fans, can be difficult without effective communication channels and interactive features.
9. **Performance Analytics and Reporting**: Providing comprehensive analytics and reports on player performance, team statistics, and other relevant data might be inadequate or inaccurate.
10. **Payment and Financial Transactions**: Ensuring smooth and secure payment processing for event registrations, ticket sales, and other financial transactions could be problematic.
11. **Adaptability to Changes**: Rapid technological advancements might make the platform's technology obsolete or less effective over time, requiring constant updates and improvements.
12. **Regulatory Compliance**: The platform must adhere to legal and regulatory requirements related to data protection, online transactions, and other relevant laws.
13. **User Support and Assistance**: Offering timely and effective customer support to address user inquiries, troubleshoot issues, and provide assistance can be a challenge.
14. **Language and Cultural Diversity**: Serving a diverse user base with varying languages and cultural preferences may necessitate localization efforts.
15. **Monetization and Sustainability**: Developing a viable business model to sustain the platform's operations, cover costs, and generate revenue can be challenging

4. Components of a Web Technology-based Platform. For a better building of a web technology-based social sports management information platform, there are specific components, which are necessary. Most of the features are based on the Java platform and provides different functionality to a web-based management system [5]. For instance, the dynamic behavior of a website is based on the integration of such components. For a web technology-based platform, database management is essential. In addition, for a reactive database system having such technology aids the sustainability and performance of the management system.

Table 4.1 of the study is related to different components related to the web-based modeling for a management system. All of the companies are related to database management and creating a webpage attractive and performing oriented [4]. Therefore, a systemic discussion of the aforementioned component in Table 4.1 is

Table 4.1: Different Components of a Web Technology-Based Platform

COMPONENTS	IDENTIFICATION	FUNCTIONALITY
Applet	A Java program in a hypertext mark-up language (HTML) page	Furnish different interactive features along with HTML alone
JSP	Java server pages	Provides a consistent way to extend web server functionality for dynamic web content
Servlet	Component architecture related to the Java programming model	Responds to client requests and develop dynamic responses
EJB	Enterprise java bean	Deliver portability across different servers
Web services	Modular applications	Works as an interface connecting provider and consumer

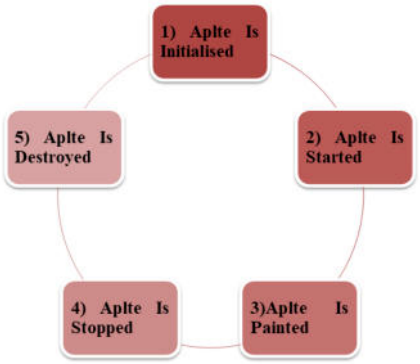

Fig. 4.1: Lifecycle of Applet

discussed in the following:

A) Applet

Applet is primarily a Java program that is associated with a Hypertext Mark-up Language (HTML) page. HTML and Cascading Style Sheets (CSS) aid the process of developing a web technology-based page [12]. However, Applet is one of the major components which provides added functionality to web pages

Figure 2 4.1 of the analysis is related to the lifecycle of Applet. It can be seen that in the initial phase, Applet is initialized, and after that Applet is started, and painted on a web page [6]. After the compilation of the task, the Applet is stopped and destroyed. Hence, the above-mentioned lifecycle functionality of Applet is described.

B) JSP

Web technology-based management system containing JSP provides a consistent way to extend web server functionality for dynamic web content. Moreover, JSP provides reliability for a web swerve.

Figure 4.2 of the study describes the role of JSP in a database and web browsing interaction. It can be seen that JSP pages are developed with a technology that is not dependent on platforms and servers [13]. Therefore, element-based and scripting-based dynamic content can be included for better performance.

C) Servlet

In a dynamic web, technology-based model Servlet is a component architecture related to the Java programming model. The primary functionality of Servletis, respond to client requests and develop dynamic responses.

Figure 4.3 of the empirical analysis provides a better understanding related to the working process of Servlet

Fig. 4.2: Role of JSP

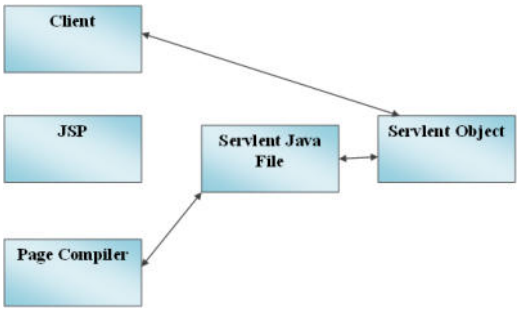

Fig. 4.3: Working process of Servlet

[10]. It can be seen that an HTTP request by a web browser is processed through a Servlet program and sent to the databases. Further, the Servlet program generates a response conveyed to the web browser.

D) EJB

An enterprise Java bean delivers portability across different servers. Moreover, EJB is the prime factor for maintaining the sustainability of a web page. Thus, for constructing a web technology-based sustainable and scalable social sports management information platform, EJB is an important component.

Figure 4.4 of the study discussed different types of EJB. It can be seen that there are session, entity, and massage-driven EJB. The development of a social sports management information platform required information processing [15]. Thus, massage-driven EJB is suitable for such a build.

E) Web services

Most web services are Modular applications that work as a modulator interface, connecting provider and consumer.

Figure 4.5 discusses different languages used in web services available for the development of web-based platforms [7]. To make a social sports management information platform, choose an appropriate server depending on the planning process. Moreover, closing a suitable server is required to be based on the aspect of scalability and sustainability.

5. Process of Web Technology-based Construction. Web technology primarily refers to using different tools and methods to establish communication between other devices. Moreover, all devices must contain the Internet to communicate [16]. In addition, having a database plays an essential role in developing a web technology-based sports management system. There are primarily two processes of development for a web technology-based management system. Front-end development related to the web page and back-end development contouring database management.

A) Frontend Development: The front end of a website refers to the area with which the user immediately

Fig. 4.4: Types of EJB

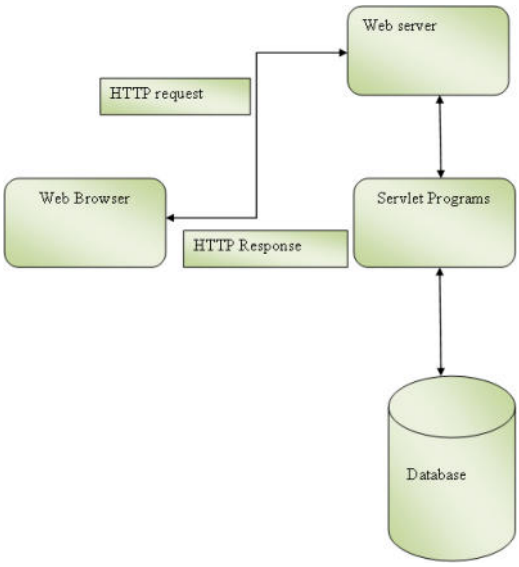

Fig. 4.5: Languages of web services

interacts. It is sometimes referred to as the application's "client side."

Table 5.1 of the study discusses different front-end languages used for developing a web page. Moreover, languages like HTML, CSS, and JavaScript are used to produce interactive web management [17].

Figure 5.1 of the empirical analysis represents a systemic amalgamation of different front-end languages It can be seen that there are main languages used that help develop the front end of a web-based system. HTML provides a basic framework. In addition, CSS and its related tools help to make a page lucrative and interactive.

B) Backend Development: A website's backend is its server side. The backend is the website area where clients or users cannot interact. In addition, a pseudo interaction is done between the backend and the user. In short, the Backend is the part of the website where data is stored in organized databases. Moreover, it is sometimes called the application's "client side."

Table 5.2 of the study discusses different backend languages used in the backend management. In addition, features of the languages are discussed in the above table.

Figure 5.2 of the Study is related to the backend of a web technology-based portal. All of the languages gave different functionality, as mentioned in Table 5.2. However, most of the languages are based on framework management. In addition, interaction with data based is dome by SQL and NoSQL. Additionally, package

Table 5.1: Different front-end languages and their functionality

LANGUAGE	FEATURES
HTML	Hypertext Markup Language Hypertext is the linkage between web pages Markup is used to represent text documentation
CSS	Cascading Style Sheets Simplifies web design process Helps to make and change designs
JavaScript	Used for creating an interactive user experience
AJAX	Primarily communicate with servers without reloading a webpage

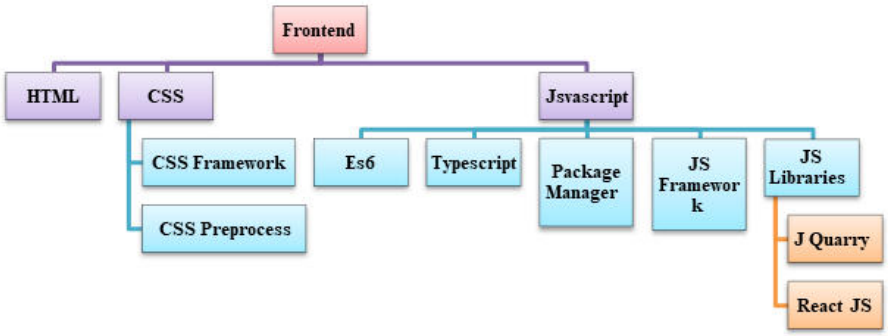

Fig. 5.1: Flow chart of Frontend

management is done with the languages [19].

Therefore, a sustainable and scalable web technology-based Sports management system is designed using such tools. In addition, the combination of different languages provides a robust structure to counter heavy traffic and make the management system interactive.

6. Problem Statement. During the analysis of the construction process of the web technology-based platform, it was noticed that sustainability is a significant issue. In addition, the scalability of such a platform is one of the significant factors that impact the sustainability process. To make a Sclabael social sports management information platform, including different algorithms is essential. In. However, such inclusion has a significant impact on the working process of a web technology-based platform. Additionally, It was noticed that social sports management information platforms process a vast amount of data [16]. Therefore, the sustainability of such a platform is a huge concern.

Figure 6.1 of the empirical study illustrates a systematic representation of the problems in a social sports management information platform. During the construction of a Platform Based on Web Technology, certain factors impact the overall sustainability. For instance, a huge amount of data related to the design is the process of a website; further information decreases the performance of a web technology-based construction [18]. On the other hand, incorporating an analytical model for a social sports management information platform is required. Analytical models of a web technology-based platform introduce analytical features [19]. For instance, with such an analytical model, historical sports management data can be analyzed to make better predictions. However, including such data hinders a website's sustainability and scalability. The reason for such hindrance is the intercity of an analytical model. Similarly, such websites process massive data sets [18]. In addition, increasing information is a significant problem with the scalability of a platform. Hence, the sustainability of a web technology-based platform is compromised due to the inclusion of considerable information.

Table 5.2: Different backend languages and their functionality

Language	**Features**
PHP	Used for scripting to the server side
Node.js	Provides an environment for JavaScript codes
Python	System to uses robust database management
Ruby	Object-oriented programming language
Java	Used to make scalable web platforms
DBMS	Interacting with database
C#	Object-oriented programming

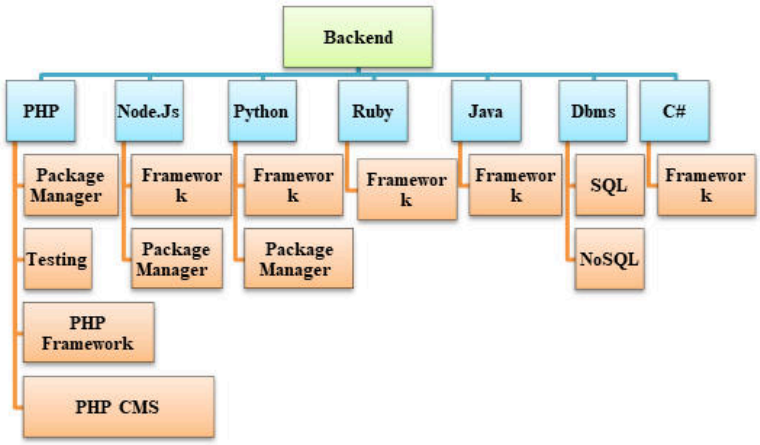

Fig. 5.2: Flow chart of Backend

Fig. 6.1: Systematic representation of the possible problem in web technology-based platform

Table 6.1: Problems in the designing process

FACTORS	IMPORTANCE
Development Strategy	Aids the process of construction
Tech Stack	Improves the capabilities of web technology-based platforms thus supporting sustainability
Compatibility	Increases the accessibility of the platform, therefore, the sustainability of such a platform is supported
Performance	Aids traffic management, thus, the sustainability of a platform is supported,
Unskilled Overlooking	Impacts the sustainability of websites and hinders the debugging process
Slow Servers	Impacts the overall performance of a web technology-based design

Table 6.1 Discuss the problems in the designing process of a web technology-based platform. It can be seen that in order to counter the aforementioned problem designing a robust platform is important. The inclusion of such factors in the process of design aids in the process of managing traffic. Further factors like compatibility, tech stack, and performance of a website are mentioned in the table. It was noticed that all of the aforementioned factors have a proportional relationship with the sustainability and scalability of a web technology-based platform.

7. Result. From the below figure of the dataset of diffusion weights, it can be said that the distribution of Reddit is 35 for the value of the standard deviation from 0 to the value 0.025. For the frequency of the distribution of Reddit, the value of the frequency distribution of the diffusion weights less than 5 for the other standard deviation. On the other hand, the value of the standard deviation for the flickr is quite distributive. All the value of the standard deviation is the highest from 0 to 0.25. The highest value of diffusion weights is 0.25, and the value is 11.5 (Frasca et al. 2020). The third value of the frequency distribution is the highest for the standard deviation of 0.00. The lowest value of the third distribution is for the standard deviation of 0.23. For the fourth frequency distribution, the highest value of the standard deviation is 0.02 and the lowest value is for the standard deviation of 0.23 (Frasca et al. 2020). Therefore, from the above graph, it is clear that the most frequent standard deviation is for the frequency distribution four and the least frequent standard deviation is for the frequency distribution first.

The above graphical analysis shows that the rate of the distribution of the frequency of the weights related to the diffusion of the individual dataset and the database. The lower distribution value of the first frequency diffusion weights is less effective for the growth and development of the sports management system which deals with the social and information platform (Frasca et al. 2020). Hence, the difference in the frequency distribution for the various datasets shows the variety in the data according to the scalability and the sustainability of the construction of the social sports management system.

From the above graph, it can be concluded that the use of the social chat board in the sports management system is the highest value for the dialog graph and most of the respondents like the dialog graph for the betterment of the sports authority. The least amount of the using app by the sports management system is the Twitter and the value of the usage of Twitter is nearly to the neither like or dislike portion (Jonell et al. 2019). Most of the people used to go to the coherent of the system in the sports management system and the highest number of the people who go for the coherent system is for the dialog graph. In the case of the interesting and fun part of the sports and the gaming system, most of the responders chose Twitter, and the app that used the least number is the BNC (Jonell et al. 2019). Therefore, the sports person and the sports management system have used the app Twitter at the highest number for advertisement of the game.

From the above graph of the confidence intervals of the evaluated matrices, it is clear that the conversation process between the sportsperson and the media is helpful for improvement and better performance. Also, the conversation between the peers of the sportsman and the other authority is constructive in increasing the rate of the version of the player (Jonell et al. 2019). Therefore, communication and conversation are of the most beneficial and effective processes to make sports management more powerful and effective for the growth and

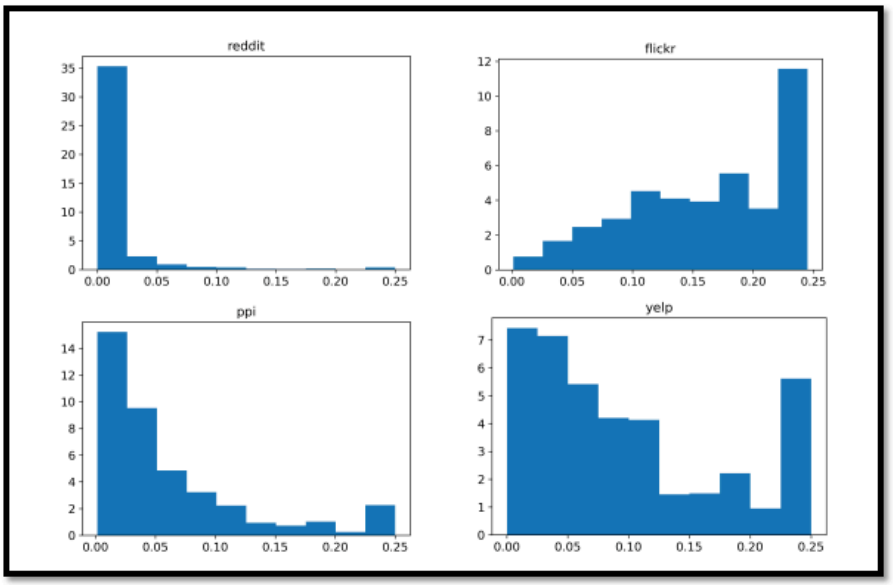

Fig. 7.1: Frequency distribution on diffusion weights over on individual dataset

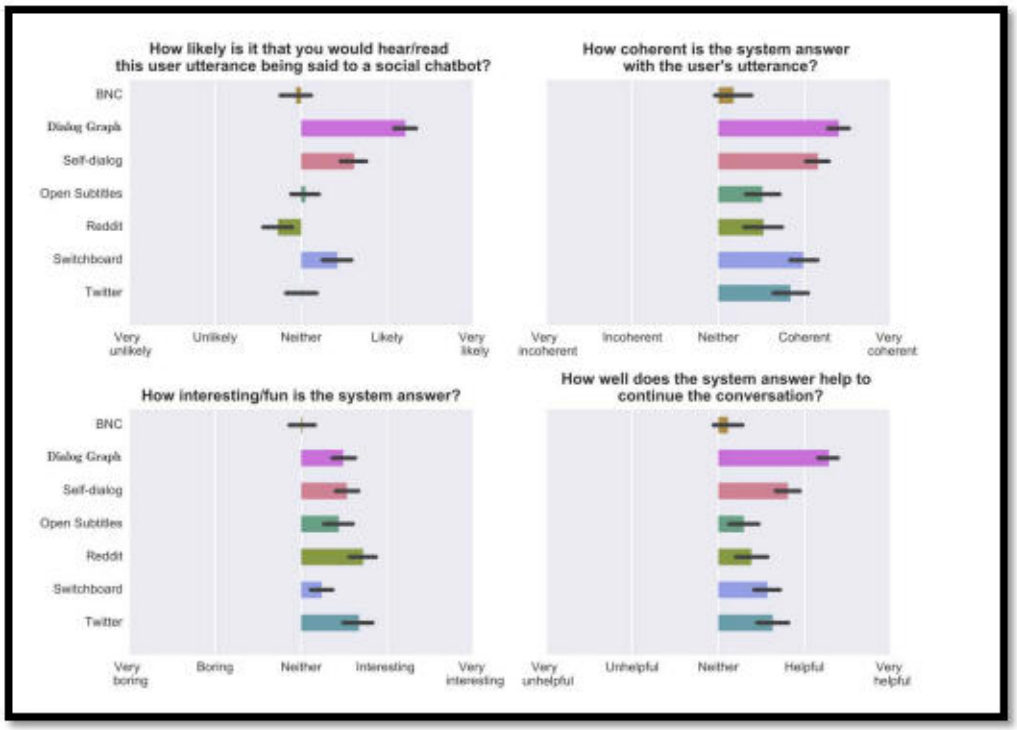

Fig. 7.2: 95% of the confidence intervals of the evaluated matrices

development of the sports authority.

8. Conclusions. Thus, a complete discussion of different web-based tools and technology is done in the study. A discussion related to different tools and technology helped to create an understanding of sustainable and scalable websites. It was understood that DBMS is a significant factor in developing a scabies sports management platform. In addition, a discussion of the problem is done that helps to understand the problem hence, in order to build a better social sports management information platform based on web technology, problems are required to be addressed. For the sustainability and scalability of such a web technology-based platform, a reduced load without compromising performance is important. Thus, addressing such issues with better technology is important. This study has extensively explored various web-based tools and technologies, shedding light on the intricacies of creating sustainable and scalable websites. Notably, the significance of a robust Database Management System (DBMS) in the development of a social sports management platform has been emphasized. While this discussion has provided valuable insights, it's apparent that challenges remain on the path to crafting an enhanced social sports management information platform grounded in web technology.

To pave the way for the future, a proactive approach is imperative. The identified challenges and issues must be tackled head-on to ensure the seamless growth of the platform. Efforts should be directed towards refining the platform's architecture, optimizing its performance, and enhancing user experience. Striving for reduced load times while maintaining optimal performance levels will be key to sustaining scalability. This entails leveraging cutting-edge technologies that can handle increasing user demands without compromising the platform's efficiency. Furthermore, the integration of advanced data management techniques and cybersecurity measures will play a pivotal role in safeguarding user data and ensuring the platform's reliability. As technology evolves, continuous updates and adaptation will be necessary to keep pace with the ever-changing digital landscape.

In essence, this study provides a stepping stone for future advancements in the realm of social sports management information platforms. By addressing challenges and embracing emerging technologies, the future holds the promise of a more sophisticated, user-centric, and efficient platform that caters to the evolving needs of athletes, coaches, and enthusiasts alike.

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