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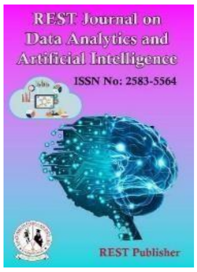


# Performance Evaluation of IoT-Based Systems Using the Weighted Product Method

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***Abstract:*** *The Internet of Things (IoT) is a pioneering concept that connects physical devices, sensors, and software**.** facilitate seamless data exchange and automation. IoT allows everyday objects, from household appliances to industrial machines, to communicate and operate intelligently through the internet. This technology is transforming industries such as healthcare, transportation, agriculture, and smart cities by improving efficiency, reducing costs, and enhancing decision-making. With the advancement of 5G technology and artificial intelligence (AI), and cloud computing, IoT continues to evolve, enabling smarter and more interconnected environments. However, to fully unlock the potential of IoT, issues such as security, privacy, and interoperability must be addressed. Research significance**:** The Internet of Things (IoT) is expanding rapidly. field with significant implications for various industries, making its research highly valuable. IoT enables seamless connectivity between devices, optimizing operations in healthcare, Manufacturing, agriculture and smart cities are key areas of IoT development. Research in IoT focuses on enhancing security, improving data management, and increasing interoperability to create efficient and scalable systems. It also explores the integration The Integration the Integration Combining cutting-edge computing with artificial intelligence enhances decision-making in real time. Understanding IoT's impact helps businesses and governments adopt innovative solutions, leading to smarter, more sustainable environments while addressing challenges like cybersecurity threats and privacy concerns**.** Methodology: The approach used in the study Research on The Internet of Things (IoT) is being studied using a mix of other research methods and literature reviews. other research methods. Experimental analysis, simulation models, and case studies. Researchers analyze existing IoT frameworks, protocols, and architectures to identify advancements and challenges. Data collection methods include real-time monitoring, sensor-based data acquisition, and cloud-based analytics. Simulation tools and machine learning models help in evaluating IoT performance under various conditions. Case studies on smart cities, healthcare, and industrial automation provide insights into real-world applications. This methodological approach ensures a comprehensive understanding of IoT's impact, enabling the development of more secure, efficient, and scalable solutions. Alternative**:** geography investigation platform, synergism design platform, building information modeling platform, digital entrustment platform, real-name registration system for labor Evaluation preference: technology maturity, urgency of need, policy feasibility, completeness of standard Results: Hash Table is getting first place of the table and Graph is getting last place of the table*

***Keywords:*** *geography investigation platform, synergism design platform, building information modeling platform, technology maturity, urgency of need, policy feasibility*

## 1. INTRODUCTION

The Internet of Things (IoT) has gained widespread interest in the technology industry. policy, and engineering, frequently making headlines in both specialized and mainstream media. This overview aims to help the Internet community understand the current debates surrounding IoT, considering the different perspectives on its potential benefits and risks. IoT is commonly used It refers to scenarios where internet connectivity and computing capabilities are embedded in objects, devices, sensors, and everyday items. Despite its growing popularity, IoT does not have a universally accepted definition, as there are a variety of interpretations. organizations and stakeholders interpret and emphasize its key characteristics in different ways. [1] In recent years, the Internet of Things (IoT) has become a major focus area. research It is considered a key component of the future Internet, in which billions of interconnected smart devices will be able to communicate. IoT is expected to enhance the capabilities of connected devices, enabling greater functionality and automation. According to Bretz, IoT refers to a system of interconnected devices. that communicate wirelessly through smart sensors. The IoT Architecture (IoT-A) project was launched to develop a standardized reference model and framework to address the specific needs of various applications. [2] This special edition, titled "Internet of Things: Challenges and Opportunities" from the "Smart Sensors, Measurements, and Tools" book series, features insights from leading experts in the field. In recent years, the Internet of Things (IoT) has received significant attention from the research, scientific, and technological communities. Although wireless sensor networks have been around for some time, IoT continues to expand its applications and influence. decades, advances in smart sensors, miniaturization, and RFID technology have expanded their applications. Extensive research and development efforts around the world are working toward making IoT a practical reality. This chapter provides insights into key challenges and concerns. considerations in implementing IoT. [3] Technologies continue to transform our lives. Among the many emerging innovations, The Internet of Things (IoT), also known as machine-to-machine (M2M) communication, is an emerging paradigm that brings both challenges and opportunities. this system, smart devices collect data, exchange information, process it collaboratively, and perform actions autonomously. With advances in sensor networks, cyber-physical systems, and IoT, these technologies have become increasingly pervasive as sensing, communication, and data analytics capabilities continue to evolve and mature. [4] The advancement The growth of the Internet of Things (IoT) is primarily driven by demand. large enterprises, which benefit from improved visibility and predictability by tracking goods across their supply chains. IoT is transforming the IT landscape, although there is no universally accepted definition among users worldwide. As IoT continues to evolve, it remains one of the most talked about and highly anticipated innovations in the field of technology, it is also called. by various names, including the embedded intelligence, connected devices, and technology omnipresence, omnipotence, and ubiquity. [5] The Internet of Things (IoT) focuses on machines that communicate with each other on behalf of humans. As we move into an era of ubiquitous connectivity, interactions between humans and devices, and interactions between devices, are becoming increasingly advanced. Although there is no single definition of IoT, it is commonly described as a system in which personal identities and virtual entities operate in smart environments, using intelligent interfaces to communicate within social, environmental, and user contexts. As a technological revolution, IoT is shaping the future of computing and communications, requiring continuous advances in emerging technologies to achieve its full potential. [6] The Internet of Things (IoT) is a rapidly growing technology is increasingly integrated into various devices and processes, Improving the overall well-being of individuals. and facilitating easy access to information and services. This article aims to provide a broad overview of IoT by analyzing recent research and developments. IoT can be described as a system that performs multiple functions, including Device modeling, control, data output, analysis, and diagnostics. Also, IoT serves as a versatile service capable of meeting various demands by leveraging its various capabilities in various applications. [7] The Internet of Things (IoT), a new technological paradigm being created by the increasing connectedness of gadgets, is expanding quickly due to the integration of physical objects with the internet. When large volumes of data are available, better services can be provided. In their quest to develop the most cutting-edge and significant IoT ecosystem, nations like China, the European Commission, and global enterprises have made IoT a key research focus. The development of IoT, a potent and useful invention, is still being shaped by research activities. Being an essential part of the "Internet of the Future," IoT represents a major shift in computing and communications. [8] The Internet of Things (IoT) is a widely discussed concept with many definitions. However, rather than focusing on a single definition, it is more important to establish a common understanding of its key components and concepts. IoT promotes standardized use of terminology to ensure clarity across industries. Despite variations in definition, all descriptions share the basic idea of Connecting the physical world with the digital domain. Internet Some perspectives emphasize that devices themselves are the “things” in the Internet of Things, highlighting their role in enabling connectivity and automation. [9] This article examines the current state of Internet of Things (IoT) research by reviewing the existing literature, analyzing trends, discussing challenges that may hinder IoT adoption, and highlighting open research questions and future directions. In addition, it provides an extensive reference list to support further research in this field. RFID technology-enabled tracking capabilities are widely recognized as the initial foundation for IoT development. Relevant studies were collected by searching scholarly databases using the keywords “Internet of Things” and “IoT”. [11] The rapid advancement of the Internet of Things (IoT) has led to a rise. various applications that significantly impact everyday life. Devices connected to IoT networks vary in their processing capabilities, yet they are designed to Information exchange and collaboration. Given the complex architecture of IoT systems, securing the sensitive layer alone is not enough to secure the entire network. As IoT continues to grow, addressing security challenges at multiple layers is a critical concern in maintaining reliable and secure IoT ecosystems. [12] Data sharing and communication. Due to the complex architecture of IoT systems, securing the sensitive layer alone is not enough to ensure complete network security. As IoT continues to expand, all Internet applications, in particular that each application essentially consists of a set of information. This perspective allows development processes and technical approaches used in other Internet applications to be referenced and adapted to implement IoT. The semantic analysis of IoT suggests that the term "thing" actually refers to information about an object, while "Internet" refers to an Internet-based application that facilitates data exchange and connectivity. [13] In recent months, it has been almost impossible to avoid encountering the term “Internet of Things” (IoT) in some form. Interest in IoT has grown significantly, especially in the past year. Various consortia have been established to develop frameworks and standards, while companies have introduced a wide range of IoT-based products and services. Initially tied to RFID technology, IoT has evolved beyond its original scope. At its core, IoT innovation is driven by The fusion of physical and digital elements is leading to the development of innovative products and business models. With rising expectations, the future IoT looks promising. [14] Some of the early papers Research into the Internet of Things (IoT) has laid the foundation for a new era in business and industry. Initially, IoT was seen as a logical progression radio frequency identification (RFID), with Kevin Ashton describing RFID as "the amoeba of the wireless computing world." The rise of the IoT is expected to bring about industry transformation and disruption, as major technological advances often lead to significant changes in market dynamics. However, at this early stage of IoT adoption, both established industry leaders and new entrants coexist in a growing market. Realizing its potential, many countries have acknowledged the role of the IoT in driving future economic growth and sustainability. [15] The term Internet of Things (IoT) has been around for years and was first introduced by the MIT Auto-IT Center. the forerunner of EPCglobal. Originally, IoT referred to a vision where all physical objects were tagged with RFID transponders, each assigned a globally unique Electronic Product Code (EPC). The system allowed for the tracking of objects while providing the EPC with a link to additional data accessible over the Internet. Over time, the concept of IoT has evolved beyond RFID. With the integration of sensors Through sensor networks and related technologies, data can be collected. extensive information about objects and their surroundings. In addition, embedded software enables data processing on the device, and when combined with actuators, this allows for local control and automation within IoT systems. [16] The evolution of technology is ongoing, and we are now entering an era of pervasive connectivity, where a vast array of devices will be connected to the internet. This marks the rise of the Internet of Things (IoT), which has been defined in various ways by various researchers. One of the most widely accepted definitions describes IoT as a world in which almost all devices and appliances are networked, allowing them to communicate and work together. Through this connectivity, devices can intelligently collaborate to perform complex tasks with greater efficiency and automation. [18] The rapid expansion of connected devices has led to The advancement of the Internet of Things (IoT) seamlessly integrates sensors and actuators with their environment, creating a network for efficient communication. Within this system, data is exchanged across different platforms to create a unified operational architecture. This paper presents a cloud-based strategy for the global deployment of IoT and explores the key technologies and application areas that will shape future research. this field. For IoT to be fully functional, computing must extend beyond traditional mobile devices such as smartphones and laptops, to connect everyday objects and embed intelligence into the environment. [19] With the advancement of Internet of Things (IoT) technology, an innovative concept called Medical Internet of Things (MIoT) has emerged. IoT offers significant advantages in data sensing, transmission, and utilization, addressing the bottlenecks and challenges faced by healthcare information systems. Its integration into the medical and healthcare industry offers vast opportunities for innovation. IoT enables instant monitoring, remote diagnostics, and data-based decision-making. enable patients to receive better medical care, reduced treatment costs, shorter recovery times, and improved healthcare services. As a result, IoT is expected to revolutionize healthcare by improving efficiency, accessibility, and overall patient outcomes. [20]

## 2. MATERIAL AND METHOD

Alternative: Geography Investigation Platform: The Geography Investigation Platform utilizes IoT and geospatial technologies to collect, process, and analyze real-time geographic data. It is essential for urban planning, environmental monitoring, disaster response, and land-use management. By integrating IoT sensors and remote sensing technologies, this platform enhances decision-making and predictive analysis for infrastructure development and resource management. Synergism Design Platform: This platform integrates IoT, cloud computing, and AI-driven analytics to facilitate collaborative design and innovation. It enables multiple stakeholders in engineering, architecture, and industrial sectors to work efficiently by sharing real-time data and insights. The platform improves workflow synchronization, reduces design errors, enhances productivity, and supports cost-effective project management. Building Information Modeling (BIM) Platform: The BIM platform revolutionizes construction and infrastructure management by incorporating IoT sensors, digital modeling, and real-time tracking. It ensures accurate material monitoring, structural integrity analysis, and compliance with safety regulations. By fostering real-time collaboration between architects, engineers, and project managers, BIM enhances project efficiency, risk mitigation, and lifecycle management. Digital Entrustment Platform: This platform leverages IoT and block chain A technology that facilitates secure, automated, and transparent data exchanges. It is widely used legal, financial, and administrative sectors for secure document authentication, identity verification, and contract execution. By integrating smart contracts and encryption techniques, the Digital Entrustment Platform ensures trust, reliability, and compliance in digital transactions. Real-Name Registration System for Labor: The Real-Name Registration System utilizes IoT-enabled biometric authentication and tracking systems to monitor workforce activities in real time. It is particularly useful in construction, manufacturing, and large-scale enterprises to prevent identity fraud, enhance payroll management, and ensure labor law compliance. This system improves workforce accountability and operational transparency.

Evaluation preference: Technology Maturity: Technology maturity refers to the level of advancement and stability of a given technology. A mature technology has undergone extensive development, testing, and real-world application, ensuring reliability, scalability, and efficiency. Evaluating technology maturity helps determine whether a solution is ready for large-scale implementation or requires further refinement before adoption. Urgency of Need: The urgency of need assesses how critical it is to implement a technology or solution within a given timeframe. High urgency indicates that immediate adoption is necessary to address pressing challenges, regulatory requirements, or market demands. It ensures that resources are allocated efficiently to prioritize solutions that deliver the most significant and timely impact. Policy Feasibility: Policy feasibility evaluates whether a technology or initiative aligns with existing regulations, legal frameworks, and government policies. A highly feasible solution complies with industry standards, reducing potential legal, financial, or ethical barriers. This factor is crucial for ensuring smooth implementation, regulatory approval, and long-term sustainability. Completeness of Standard: Completeness of standard examines the extent to which a technology or solution adheres to established industry protocols, guidelines, and best practices. A well-standardized system ensures interoperability, security, and reliability, making integration with existing infrastructures seamless. Evaluating this criterion helps organizations adopt solutions that meet industry benchmarks and regulatory expectations.

**WPM method:** This study primarily focuses on the handover decision phase and aims to reduce the processing delay during handover. It compares the Simple Additive Weighting (SAW) method and the Weighted Product Model (WPM) to determine the optimal network connection by estimating the quality indicator (Qi) parameters of the mobile terminal (MT). The paper investigates vertical handover decision-making schemes, using SAW and WPM to select the most suitable visitor network (VT) to maintain seamless connectivity. The proposed approach implements WPM in a distributed manner and is compared with SAW. WPM, closely related Multiplicative Exponent Weighting (MEW) is another name for the Weighted Sum Model (WSM). [1] This study uses the Analytic Hierarchy Process (AHP), Weighted Sum Model (WSM), and Weighted Product Model (WPM) to solve the labor selection problem. These methods help identify the best operator from multiple alternatives. The article presents the application of these multiple criteria decision making (MCDM) methods to assess worker skill levels and optimize operator selection for specific tasks. Although WPM is closely related to WSM, the main difference lies in their approach - WSM uses addition, whereas WPM uses multiplication. In WPM, each alternative is evaluated by multiplying several ratios associated with different criteria, which allows for comparative analysis. [2] Works based on the Weighted Sum Model (WSM assumption of additive utility, meaning The overall value of each alternative is calculated by summing the products of the normalized values criterion weights. WSM is best suited for single-dimensional problems where all units are uniform. Weighted Product Model (WPM), while similar to WSM, differs in its approach by using multiplication instead of addition. WPM is applicable to both Applicable to single and multidimensional multiple criteria decision making (MCDM) problems, it provides benefits using relative values instead of absolute values. Among the MCDM/MADM methods, WSM, WPM, and TOPSIS are widely used to solve complex engineering decision-making problems. [3] This approach employs the weighted product method (WPM) and the priority ranking method for enrichment estimation (PROMETHEE), two multiple attribute decision making (MADM) methodologies. Both strategies facilitate optimal decision-making by effectively estimating the link between parameters and mining processes. When compared to alternative decision-making models, the suggested methods offer more accuracy and quicker computation. There are two types of mining: open pit mining and underground mining. Mining is the process of taking minerals out of the earth. The properties of the ore body dictate the mining technique to be used. making certain that the best extraction method is applied. [4] To explore the limitations and opportunities of using the Weighted Product Method (WPM) routing technique, a hierarchical approach is used. The study examines WPM routing at three levels: circuit level, system level, and physical design level. A detailed analysis of WPM routing at these hierarchical levels is described in the following chapters. At the circuit level, the focus is on design, verification, and optimization, along with assessing crosstalk noise, power supply noise, and clock skew tolerance. The physical design constraints of WPM routing are analyzed using the GORDIAN placement algorithm, compaction techniques, and simulated annealing to assess its feasibility. [5] The Weighed Product Method (WPM) detectors receive signals from an extended wire, which is triggered by a 140 MHz RF signal and positioned in the center of the tube. This wire serves as a fixed reference point in the laboratory frame, while the detectors are securely attached to the CM elements for monitoring purposes. The selection of connectors and RF coaxial cables to effectively transmit signals from the WPM to the external cry module is a major technical challenge. Real-time monitoring of each WPM set, including tracking its displacement over time, can be performed using a menu-driven interface. The detectors are mounted on a two-axis translation stage, which allows them to be positioned anywhere within their bore in relation to the fixed wire. [6] The coalition structure formation (CSG) problem is a key aspect of coalition games, which aims to form agent coalitions that maximize the overall welfare. Weighted Partial Max-SAD (WPM) encoding has been shown to be very efficient in solving this problem. This approach translates The set of constraints is converted into Boolean propositional logic, using the WPM solver to find the optimal solution. In WPM encodings for CSG, in addition to representing the relationships between agents or rules, a significant number of intermediate rules serve as the foundation for reasoning. To improve performance, an improved rule-relation-based WPM encoding has been developed based on a refined MC-net model, using a much smaller representation of the intermediate rules. [8] Wireless sensor network (WSN) facilitates data aggregation, communication, and processing in outdoor environments or base stations. This study focuses on optimizing cluster head (CH) selection and implementing synchronous data sinking operations to improve energy and time efficiency. A k-means algorithm-driven method was introducing select cluster heads, which ensures optimal network performance. In addition, simple additive weighting (SAW) and weighted product method (WPM) are used to prioritize data sinking operations through the decision performance ranking. In this method, weights are assigned and pre-processed based on node functions or attribute values, which are then used to efficiently cluster nodes. [9] This suggests that words per minute The Weighted Production Method (WPM) is an unreliable measure for assessing reading development because of linguistic and spelling variations. significantly affect the reading acquisition process. Although Since WPM and comprehension are interconnected, there is a tendency to assume that higher WPM scores automatically reflect better comprehension and reading ability. However, this perspective presents a narrow view of both reading and language. The primary argument in favor of WPM monitoring is outlined in Abdi (2011), which is extensively discussed in this study. Consequently, the assumption that WPM measures can effectively compare reading progress across countries needs to be critically examined. [10]

## 3. RESULTS AND DISCUSSION

**TABLE 1.** Internet of Things

| | Technology maturity | Urgency of need | Policy feasibility | Completeness of standard |
|---|---|---|---|---|
| Geography investigation platform | 6 | 2 | 4 | 6 |
| Synergism design platform | 4 | 5 | 1 | 2 |
| Building information modeling platform | 3 | 4 | 7 | 5 |
| Digital entrustment platform | 5 | 3 | 4 | 3 |
| Real-name registration system for labor | 7 | 9 | 2 | 4 |

The evaluation of various platforms and systems based on technology maturity, urgency of need, policy feasibility, and completeness of standards highlights their strengths and weaknesses. The geography investigation platform scores high in technology maturity (6) and completeness of standards (6), but its urgency is lower (2). The synergism design platform is highly needed (5) but has low policy feasibility (1). The building information modeling platform excels in policy feasibility (7), indicating strong regulatory support. The digital entrustment platform shows balanced scores but lacks urgency (3). The real-name registration system for labor ranks highest in urgency (9), signifying immediate necessity.

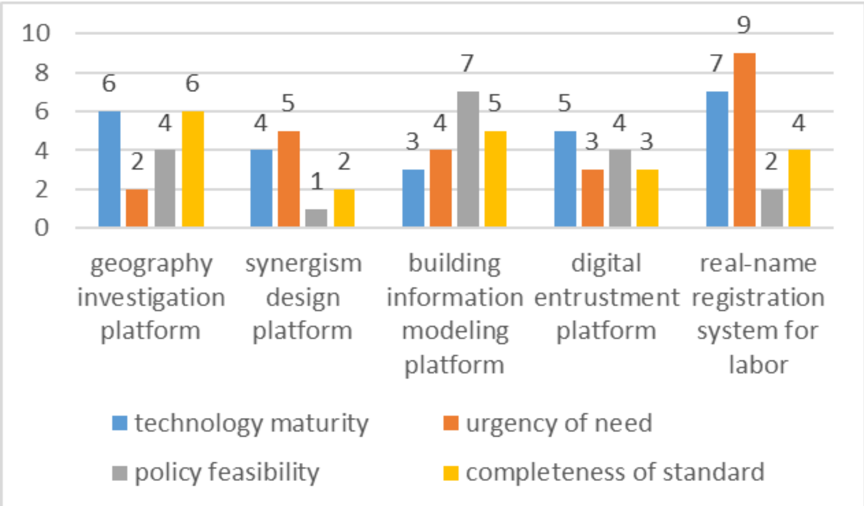


**FIGURE 1.** Internet of Things

The bar chart presents a comparative analysis of five platforms based on four key criteria: technology maturity (blue), urgency of need (orange), policy feasibility (gray), and completeness of standards (yellow). Key Observations: Geography Investigation Platform Strong in technology maturity (6) and completeness of standards (6) but has low urgency of need (2) and moderate policy feasibility (4). Synergism Design Platform Balanced performance across technology maturity (4) and completeness of standards (5) but has the lowest policy feasibility (1). Building Information Modeling (BIM) Platform Excels in policy feasibility (7) but has relatively low urgency of need (2) and moderate scores in other factors. Digital Entrustment Platform Consistent across all criteria, with scores ranging from 3 to 5, showing balanced performance without any extremes. Real-Name Registration System for Labor Has the highest urgency of need (9) and strong technology maturity (7), but lower policy feasibility (2) and moderate completeness of standards (4). Conclusion: The real-name registration system for labor stands out due to its high urgency of need, while the building information modeling platform excels in policy feasibility. The synergism design platform shows strong standard completeness but faces challenges in policy feasibility. The digital entrustment platform maintains a balanced profile, whereas the geography investigation platform is strong in maturity and standard completeness but lacks urgency. These insights can help prioritize platforms based on specific strategic goals.

**TABLE 2.** Performance value

| | Technology maturity | Urgency of need | Policy feasibility | Completeness of standard |
|---|---|---|---|---|
| Geography investigation platform | 0.85714 | 0.22222 | 0.25000 | 0.33333 |
| Synergism design platform | 0.57143 | 0.55556 | 1.00000 | 1.00000 |
| Building information modeling platform | 0.42857 | 0.44444 | 0.14286 | 0.40000 |
| Digital entrustment platform | 0.71429 | 0.33333 | 0.25000 | 0.66667 |
| Real-name registration system for labor | 1.00000 | 1.00000 | 0.50000 | 0.50000 |

The performance values represent the relative strengths of different platforms across four key factors: technology maturity, urgency of need, policy feasibility, and completeness of standards**.** The real-name registration system for labor scores the highest in technology maturity (1.00000) and urgency of need (1.00000)**,** emphasizing its immediate importance. The synergism design platform stands out in policy feasibility (1.00000) and completeness of standards (1.00000**)**, indicating strong regulatory support. The geography investigation platform performs well in technology maturity (0.85714**)** but has lower urgency (0.22222). The building information modeling platform scores relatively low in policy feasibility (0.14286), while the digital entrustment platform maintains moderate balance across all factors.

**TABLE 3.** Weight

| | Technology maturity | Urgency of need | Policy feasibility | Completeness of standard |
|---|---|---|---|---|
| Geography investigation platform | 0.25 | 0.25 | 0.25 | 0.25 |
| Synergism design platform | 0.25 | 0.25 | 0.25 | 0.25 |
| Building information modeling platform | 0.25 | 0.25 | 0.25 | 0.25 |
| Digital entrustment platform | 0.25 | 0.25 | 0.25 | 0.25 |
| Real-name registration system for labor | 0.25 | 0.25 | 0.25 | 0.25 |

The weight values indicate that each criterion—technology maturity, urgency of need, policy feasibility, and completeness of standards—is given equal importance across all platforms. With a uniform weight of 0.25 for each factor, the evaluation does not prioritize any specific aspect, ensuring a balanced assessment. This approach treats all dimensions as equally significant in determining the overall performance of each platform. Consequently, the final rankings will depend entirely on the raw performance scores rather than any bias towards a particular criterion. This method is useful when all aspects are considered equally crucial for decision-making.

**TABLE 4.** Weighted normalized decision matrix

| | Technology maturity | Urgency of need | Policy feasibility | Completeness of standard |
|---|---|---|---|---|
| Geography investigation platform | 0.96220 | 0.68659 | 0.70711 | 0.75984 |
| Synergism design platform | 0.86944 | 0.86334 | 1.00000 | 1.00000 |
| Building information modeling platform | 0.80911 | 0.81650 | 0.61479 | 0.79527 |
| Digital entrustment platform | 0.91932 | 0.75984 | 0.70711 | 0.90360 |
| Real-name registration system for labor | 1.00000 | 1.00000 | 0.84090 | 0.84090 |

The Weighted Normalized Decision Matrix provides a comparative evaluation of different platforms based on four key criteria: technology maturity, urgency of need, policy feasibility, and completeness of standards. The real-name registration system for labor ranks the highest in technology maturity (1.00000) and urgency of need (1.00000), indicating its immediate necessity and advanced technological readiness. The synergism design platform stands out in policy feasibility (1.00000) and completeness of standards (1.00000), suggesting strong regulatory backing. The geography investigation platform has high technology maturity (0.96220) but moderate policy feasibility (0.70711). The digital entrustment platform maintains balanced performance, excelling in completeness of standards (0.90360). Meanwhile, the building information modeling platform shows strong performance across most factors but has a lower policy feasibility score (0.61479).

**TABLE 5.** Preference Score

| Preference score | |
|---|---|
| Geography investigation platform | 0.35495 |
| Synergism design platform | 0.75062 |
| Building information modeling platform | 0.32300 |
| Digital entrustment platform | 0.44632 |
| Real-name registration system for labor | 0.70711 |

The Preference Score represents the overall ranking of each platform based on its weighted and normalized performance across four key factors: technology maturity, urgency of need, policy feasibility, and completeness of standards. A higher score indicates a stronger preference for selection. Synergism design platform has the highest score (0.75062), reflecting its strong performance, particularly in policy feasibility and completeness of standards. Real-name registration system for labor follows closely with 0.70711, signifying its high urgency and technological maturity. Digital entrustment platform has a moderate preference score (0.44632), showing balanced performance but not excelling in any single factor. Geography investigation platform (0.35495) and building information modeling platform (0.32300) rank lower, indicating relatively weaker overall performance.

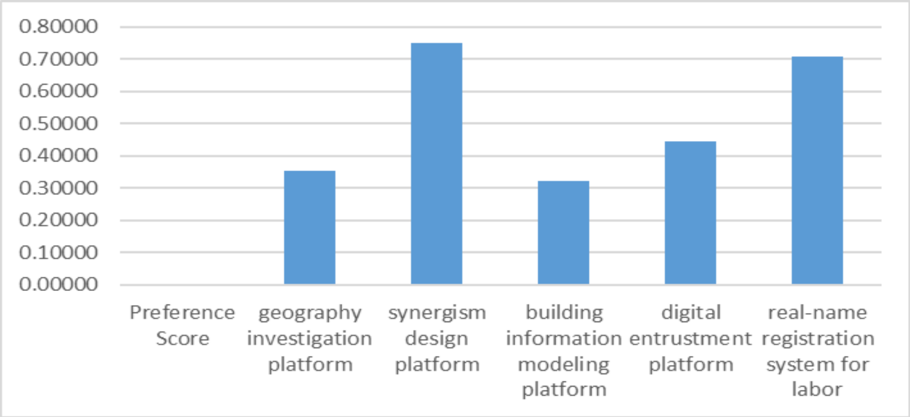


**FIGURE 2.** Preference Score

The bar chart illustrates the Preference Scores for five platforms, showing their overall suitability based on factors such **as** technology maturity, urgency of need, policy feasibility, and completeness of standards**.** Key Observations: Synergism Design Platform has the highest Preference Score (~0.75)**,** indicating it is the most favorable option due to strong policy feasibility and completeness of standards**.** Real-Name Registration System for Labor follows closely with a high Preference Score (~0.71)**,** mainly driven by its high urgency of need and technology maturity**.** Digital Entrustment Platform has a moderate score (~0.45), reflecting balanced performance across all evaluation criteria. Geography Investigation Platform and Building Information Modeling (BIM) Platform have lower Preference Scores (~0.35 and ~0.32, respectively**)**, indicating that they are less favorable for prioritization.

**TABLE 6.** Rank

| Rank | |
|---|---|
| Geography investigation platform | 4 |
| Synergism design platform | 1 |
| Building information modeling platform | 5 |
| Digital entrustment platform | 3 |
| Real-name registration system for labor | 2 |

The Rank assignment is based on the Preference Scores, which evaluate each platform's overall performance across technology maturity, urgency of need, policy feasibility, and completeness of standards. A lower numerical rank indicates better suitability for selection. The Synergism Design Platform ranks first (1st) with the highest Preference Score (0.75062), making it the most favorable option due to its strong policy feasibility and completeness of standards. The Real-Name Registration System for Labor holds the second (2nd) rank (0.70711), driven by its high urgency of need and technology maturity. The Digital Entrustment Platform ranks third (3rd) (0.44632), indicating balanced but moderate performance. The Geography Investigation Platform is ranked fourth (4th) (0.35495) due to its lower urgency and policy feasibility. The Building Information Modeling Platform is ranked fifth (5th) (0.32300), as it has the lowest Preference Score, reflecting weaker feasibility and urgency.

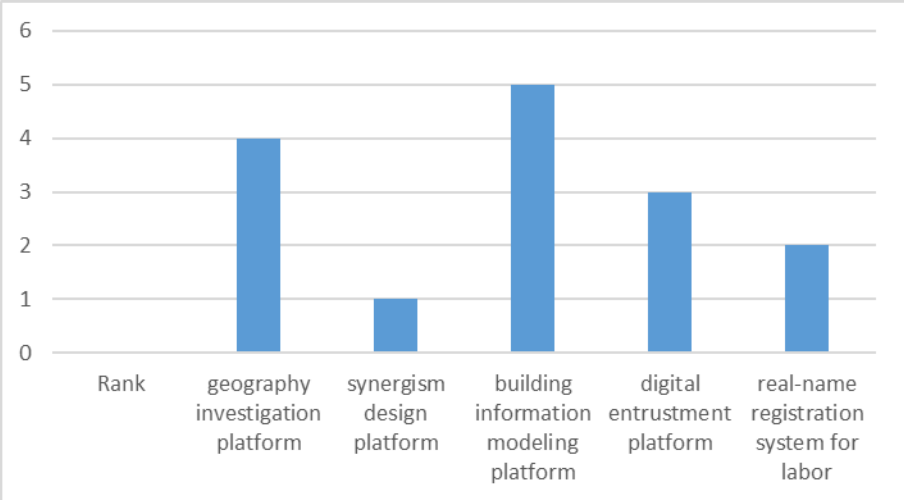


**FIGURE 3.** Rank

The bar chart illustrates the ranking **o**f five platforms based on their Preference Scores, where a lower rank indicates a more favorable option. Key Observations: Synergism Design Platform ranks 1st, making it the best-performing option due to its high policy feasibility and completeness of standards**.** Real-Name Registration System for Labor is ranked 2nd, driven by its high urgency of need and technology maturity**.** Digital Entrustment Platform holds 3rd place, reflecting a balanced but moderate performance across all evaluation criteria. Geography Investigation Platform is ranked 4th, showing strong technology maturity but lower urgency and feasibility. Building Information Modeling (BIM) Platform is ranked 5th, indicating that it has the lowest overall suitability, primarily due to its weak policy feasibility

## 4. CONCLUSION

The Internet of Things (IoT) is a fascinating technology that links physical objects, enabling automation and real-time data sharing in a variety of sectors. Its impact has extended to smart cities, healthcare, manufacturing, and logistics, increasing productivity, cutting expenses, and improving user experiences. IoT is driving advancements in artificial intelligence as it develops. big data analytics, and cloud computing. Creating a more interconnected and intelligent ecosystem. The main benefit of IoT is its ability to improve operations and improve decision-making. By leveraging smart sensors, embedded systems, and real-time monitoring, IoT increases productivity while reducing human intervention. For example, in healthcare, IoT-enabled devices such as wearables and remote monitoring systems help doctors monitor a patient’s health in real time. In smart cities, IoT-based solutions improve traffic management, waste collection, and energy conservation. Despite its numerous benefits, IoT also presents several Obstacles such as data security risks, privacy concerns, and interoperability challenges. With billions of devices interconnected, the risk of cyberattacks increases, necessitating robust security measures. Additionally, the lack of standardized protocols can hinder seamless communication between different IoT devices and platforms. Addressing these challenges requires collaboration among governments, industries, and technology providers to establish strong security frameworks and universal standards. Looking ahead, the future of IoT is promising, with advancements in 5G connectivity, edge computing, and artificial intelligence driving further adoption. As IoT becomes more integrated into daily life, businesses and individuals must embrace best practices to maximize its benefits while minimizing risks. By leveraging IoT responsibly, society can build smarter, more sustainable environments that enhance efficiency and improve quality of life. Ultimately, IoT represents a paradigm shift in how humans interact with technology, shaping a more connected and intelligent world.

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