International Journal of
INTELLIGENT SYSTEMS AND APPLICATIONS IN ENGINEERING
ISSN:2147-6799 www.ijisae.org Original Research Paper

A Novel Approach for IoT-Based Cloud Computing Technology and its Impact on Business Entrepreneurship

Sanjay Kumar[1], Pramod Kumar[*2], Sayed Sayeed Ahmad[3], P. Jayasaradadevi[4], Sivaram Rajeyyagari[5], Geetha Manoharan[6], Venkateswaran Radhakrishnan[7]

Submitted: 20/10/2023 **Revised**: 22/12/2023 **Accepted**: 28/12/2023

Abstract: In recent years, the convergence of the Internet of Things (IoT) and cloud computing has paved the way for revolutionary advances in technology. The integration of IoT and cloud computing optimizes business operations by providing real-time insights into various processes. Entrepreneurs can leverage this data to make informed decisions, streamline workflows, and enhance overall efficiency. This synergy has not only revolutionized the way we interact with our surroundings, but also sparked a wave of innovation that has profound implications for entrepreneurship. This paper explores a new approach to IoT-based cloud computing technology and its significant impact on the entrepreneurship landscape.

Keywords: - *internet of things (IoT), technology, artificial intelligence, cloud computing, machine learning.*

Introduction

In a rapidly evolving technology environment, the convergence of the Internet of Things (IoT) and cloud computing has ushered in a new era of opportunity that will significantly impact the field of entrepreneurship. At the core of this new approach is the seamless integration of IoT and cloud computing to create a specialized infrastructure that addresses the unique challenges arising from the dynamics of IoT applications. Unlike traditional cloud architectures, this system is tailored to efficiently process large data streams generated by a large number of interconnected devices, ensuring real-time processing and analysis. Additionally, we place special emphasis on security protocols to protect sensitive information and foster a secure and reliable ecosystem. One of the main impacts of this new approach to corporate entrepreneurship is that it will lead to increased efficiency and productivity in various areas of work. The convergence of IoT and cloud computing gives entrepreneurs access to real-time insights into their processes. This new functionality allows you to make data-driven decisions, optimize workflows, and improve overall operational efficiency. The result is a business environment that is not only adaptive, but flexible enough to respond to changing market dynamics. Since the 1980s, with the advent of information and communication technology, ideas and theories surrounding business models (BM) and business model innovation (BMI) have been established. (ICT). In today's business world, information moves freely, assets are increasingly digitalized, and connections between all stakeholders are ubiquitous (Saratchandra & Shrestha, 2022). Maintaining competitive advantage requires constant reinvention of service delivery-focused business models and customer-centric value

[1]*Assistant Professor, Department of Computer Application, Lalit Narayan Mishra Institute of Economic Development and Social Change,1-Nehru Marg Patna, Bihar, India.*

[*2]*Associate Professor, Faculty of Commerce and Management, Assam Downtown University, Sankar Madhab Path, Gandhi Nagar, Panikhaiti, Guwahati, Assam-781026, India. (Orcid-ID: - 0000-0002-1971-4770, WOS-ID: - AFI-8166-2022).*

[3]*School of Engineering and Computing, De Montfort University, Dubai, United Arab Emirates.*

[4]*Assistant Professor, Department of Management Studies, Gayatri Vidya Parishad College for Degree and PG Courses, Visakhapatnam, Affiliated to Andhra University.*

[5]*Department of Computer Science, College of Computing and Information Technology, Shaqra University, Shaqra, Saudi Arabia.*

[6]*School of Business, SR University, Warangal, Telangana, India.*

[7]*Sr. Faculty, Information Technology Department, College of Computing and Information Sciences, University of Technology and Applied Sciences-Salalah, Oman.*

Email: - san_pat_01@yahoo.co.in, pramodtiwaripatna@gmail.com, saeed.ks@gmail.com, psarada6@gmail.com, dr.sivaram@su.edu.sa, geethamanoharan1988@gmail.com,

[1]*Venkateswaran.Radhakrishnan@utas.edu.om*

**Corresponding Author: pramodtiwaripatna@gmail.com*

propositions. Current trends in digital business transformation indicate that many large enterprises consider these business needs to be a top goal (Caryannis, Grigoroudis, Stamati, and Valvi, 2021). However, there is a lack of reliable and applicable empirical foundations that combine the concepts of business model innovation (BMI) and digital transformation, especially for service-oriented business models (Dong & Wang, 2022). Most executives still use the term "innovation" to mean new products or processes, rather than new approaches to business. A historical and early definition by Thompson (1965) states that "innovation is the generation, acceptance, and implementation of new ideas, processes, goods, or services."

Adopting a process perspective requires a commitment to continuous process improvement. When companies find viable solutions to long-standing problems, their processes are innovated (Banda, Mzyece, and Mekuria, 2022). Innovators perform standard business procedures in novel ways that produce beneficial and beneficial results for both those involved in the procedure and those who depend on it. An example of a process innovation is the introduction of a new production sequence (assembly line) that increases production by 100% while reducing costs and lead times (Banda et al., 2022). The development of every sector of the Indian economy is being driven by unicorn companies that are leading the digital transformation of their respective industries through technological innovation. In 2022, India's unicorn appearance rate will surpass China's. More than 20 startups have recently surpassed $1 billion in market value. Recently, Walmart, the world's largest retailer, paid $21 billion to acquire Flipkart, one of India's most successful startups and the country's largest e-commerce company (Franco, Minatogawa, Duran, Batchio, & Cuadros, 2021). His OYO Rooms, a technology-enabled hotel franchise model, has become India's largest company, surpassing both the traditional Indian hotel sector and international hotel chains.

Business model innovation is another notable outcome of this new approach. Entrepreneurs have the opportunity to explore new territory while leveraging the power of IoT-based cloud infrastructure. Subscription-based services, predictive maintenance models, and data-driven customization are examples of innovative business models that leverage the potential of technology. These models not only provide new revenue streams, but also place entrepreneurs at the forefront of market trends and foster a culture of continuous innovation. Cost reduction and scalability are essential elements of this new approach, which is especially beneficial for startups and small businesses.

Cloud Computing Technology

Cloud computing allows entrepreneurs to seamlessly scale their businesses by eliminating the need for large investments in physical infrastructure. The pay-as-you-go model also ensures cost-efficiency, making cutting-edge technology accessible to a wide range of business ventures. This democratization of technology is a catalyst that fosters entrepreneurship and innovation across different economic strata. The system hardware and software are used to run applications that users access online. Central to this approach is the concept of data-driven decision-making. The rich data generated by IoT devices is becoming a strategic asset for entrepreneurs, providing unprecedented insight into customer behavior, market trends, and operational performance. This increases company's adaptability and competitiveness in an ever-evolving market environment. Entrepreneurs with actionable insight can adapt their strategies quickly to keep up with consumer demand and stay ahead of competitors.

Fig 1.1: Cloud Computing Technology

The impact of this novel approach extends to a critical aspect of modern business success: customer experience. IoT data allows entrepreneurs to personalize products and services and tailor offers to individual tastes. This level of customization not only meets customer needs, but also fosters brand loyalty and positive word of mouth, important factors in a competitive market where customer experience is paramount.

Additionally, this new approach focuses on security and compliance. At a time when data breaches and privacy concerns are widespread, business owners can guarantee data confidentiality and privacy to their customers. Building trust through robust security measures not only improves a company's reputation, but also ensures compliance with regulatory standards, an increasingly important factor in today's interconnected and regulated business environment. This paper explores an innovative approach that leverages the synergies of IoT-based cloud computing technologies and examines its transformative impact on business endeavors.

IoT-Based Cloud Computing Technology Model

The IoT-based cloud computing technology model represents a transformative convergence of two pivotal technological domains: The Internet of Things (IoT) and cloud computing. In this model, a vast network of interconnected devices—ranging from everyday objects to sophisticated sensors and machinery—collects and transmits data, which is then processed, analyzed, and stored in the cloud.

At its core, this model capitalizes on the strengths of both IoT and cloud computing. The IoT aspect involves the proliferation of smart devices embedded with sensors that gather real-time information. These devices communicate seamlessly with the cloud, where the data undergoes processing, often employing advanced analytics and machine learning algorithms. The cloud serves as a centralized hub, offering the computational power and storage capacity necessary to handle the massive volumes of data generated by the IoT ecosystem.

This model's impact is profound, fostering efficiency, innovation, and scalability. Businesses leverage the real-time insights derived from IoT devices to make informed decisions, optimize operations, and develop responsive strategies. The cloud's scalability ensures that as the IoT network expands, the infrastructure can accommodate increased data flows and computational demands. Furthermore, the model supports enhanced security measures, ensuring the integrity and confidentiality of the data flowing between devices and the cloud. As businesses increasingly adopt this IoT-based cloud computing technology model, they position themselves at the forefront of a data-driven, interconnected future, unlocking unprecedented opportunities for growth and technological advancement.

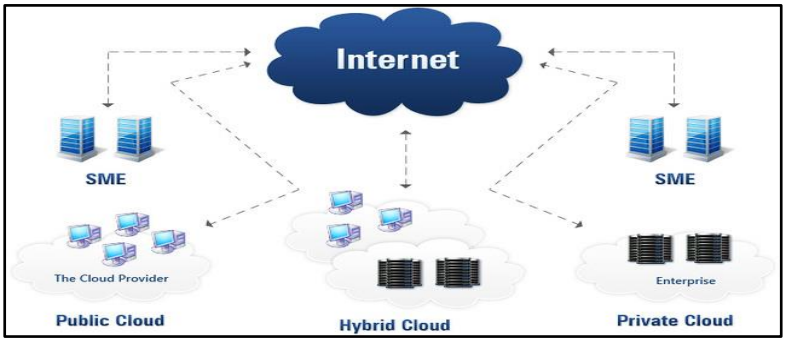

Fig. 2:- IoT-Based Cloud Computing Technology Model

Potential Application Domains of IoT-Based Cloud Computing Technologies

The potential applications of IoT-based cloud computing technologies are wide and diverse and are expected to have a transformative impact on many industries. One important area is smart cities. Smart cities enable efficient city management with IoT devices and sensors connected to cloud infrastructure. These include improving public services through intelligent traffic management, waste management, and real-time data analysis.

In healthcare, IoT-based cloud computing enables remote patient monitoring, smart medical devices, and personalized healthcare solutions. These

technologies improve the quality of patient care, streamline healthcare processes, and provide valuable insights to healthcare professionals.

The Industrial Internet of Things (IIoT) leverages cloud computing to optimize manufacturing processes, monitor equipment health, and enhance overall operational efficiency. Predictive maintenance and real-time monitoring capabilities offered by this technology reduce downtime and increase the lifespan of industrial machinery.

In agriculture, IoT-based cloud computing technologies empower farmers with precision farming solutions. Smart sensors collect data on soil conditions, weather patterns, and crop health, enabling farmers to make data-driven decisions for optimized crop yields.

Retail is another domain benefitting from these technologies, with IoT devices providing inventory management, supply chain optimization, and personalized customer experiences. Smart homes, logistics, energy management, and environmental monitoring are other areas where the convergence of IoT and cloud computing is creating innovative solutions that are revolutionizing the way we live, work, and interact with the world. As these technologies continue to develop, their applications are likely to expand and provide new opportunities for efficiency, sustainability, and improved quality of life.

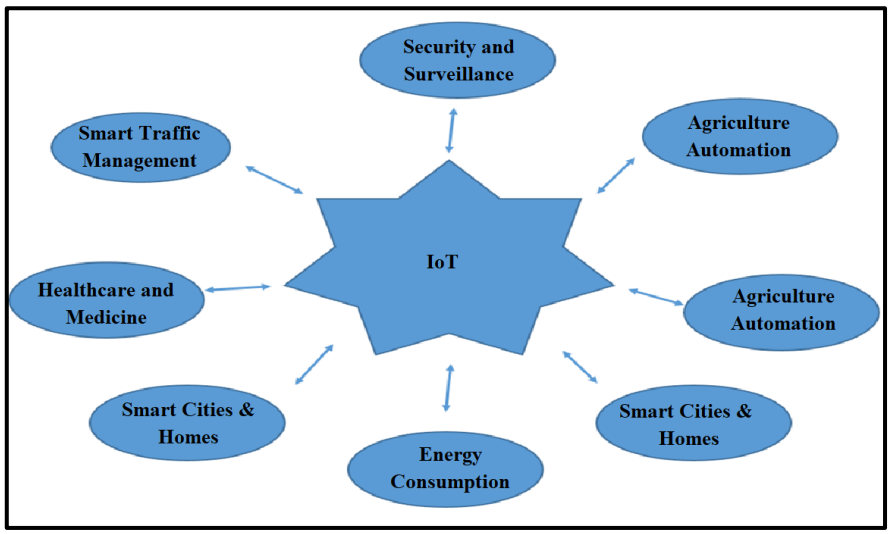

Fig. 3:- Application of IoT-Based Cloud Computing Technologies

Major Key Issues and Challenges Of IoT

The widespread adoption of the Internet of Things (IoT) has brought significant advances, it has also raised many important issues and challenges that require careful consideration. A big concern is security. The proliferation of interconnected devices expands the attack surface and makes the IoT ecosystem vulnerable to cyber threats. Ensuring robust security measures such as encryption, authentication, and secure device management is paramount to protecting sensitive data and preventing unauthorized access.

Another challenge is interoperability. Different IoT devices from different manufacturers often have incompatible communication protocols and data formats. Establishing standardized protocols is important to enable seamless communication and interoperability between different devices and platforms.

Data protection is a pressing issue, especially as IoT devices continually collect and transmit large amounts of personal data. Finding a balance between using data to gain valuable insights and protecting individual privacy is a challenge that requires strict regulation and ethical considerations. Scalability and managing the vast amounts of data generated by IoT devices presents logistical challenges. Developing efficient data storage, processing, and analysis infrastructure is critical to gaining meaningful insights without burdening existing systems. Power consumption and battery life are major concerns for IoT devices, especially those located in remote or resource-limited environments. Improving energy efficiency and exploring sustainable energy sources are essential to extend the lifespan of these devices.

Conclusion

In conclusion, new approaches to IoT-based cloud

computing technologies represent a paradigm shift in the field of entrepreneurship. Its transformative impact includes increased efficiency, innovative business models, cost savings, scalability, data-driven decision-making, improved customer experience, and robust security. Entrepreneurs who take this novel approach aren't just adapting to technological advances; They position themselves as pioneers of a digitally connected, data-driven future. As the IoT ecosystem continues to evolve, its profound impact on entrepreneurship will shape the trajectory of innovation and success for years to come.

References

[1] Chandra, K. Ram, M. Ramachandran, and Soniya Sriram Kurinjimalar Ramu. "Exploring The Possibilities of Web Based Learning." Contemporaneity of Language and Literature in The Robotized Millennium 4.1 (2022): 19-27.

[2] Chandra, K. Ram, Et Al. "Understanding Blended Learning Advantages and Limitations." Contemporaneity of Language and Literature in the Robotized Millennium 4.1 (2022): 10-18.

[3] Chandra, K. Ram, Et Al. "Recent Trends in Workplace Learning Methodology." Contemporaneity of Language and Literature in the Robotized Millennium 4.1 (2022): 28-36.

[4] Chala Wata Dereso, Dr. Om Prakash H. M., Dr. K. Ram Chandra, Dr. Javed Alam, Dr. K. S. V. K. S. Madhavi Rani, Dr. V. Nagalakshmi. “Education beyond Covid-19 –The World Academic Coalition”. Annals of the Romanian Society for Cell Biology, Vol. 25, No. 2, Mar. 2021, Pp. 2062-76.

[5] K Ram Chandra, Bbrg Vijaya Lakshmi, Mrs G Rani, Raghavendra Kumar. “Farmer Digital Marketing System” Solid State Technology, Vol. 63, No. 5 (2011), 3250-3257.

[6] Ram Chandra Kalluri. “Meaning Reorganization View Vis-A- Vis Hidden Reality View-Revisiting The Allotropes of Psychodynamics of Insight”. International Journal of Human Resources Management and Research, Vol. 3 No. 4 (2013), 69-74.

[7] K Ram Chandra. “Hetero-Balancing Approach to Curriculum Planning Using the Systemic-Functional Analysis” Proceedings of Isfc 35: Voices Around the World, 78.

[8] Svgva Prasad, Cm Anitha, K Ram Chandra, Vijaya Lakshmi, Ravi Chandran, B Annapurna. “Pesticide Spraying Robot: The Mechatronics Approach to Agriculture”. International Journal of Early Childhood Special Education, Vol.14 No.5, 2022.

[9] Dr. M. Esther Kalyani P. Hemalatha, Dr. K Ram Chandra, Dr. Shakila Azim, Dr. B. Annapurna, Dr. V. Nagalakshmi. “The Element of Emotional Intelligence and Their Impact on Social Relation”. International Journal of Early Childhood Special Education. Vol.14 No.03 (2022), 7.

[10] Ram Chandra Kalluri. “Effects of Covid-19: The Psychosocial Impact on Schools and College Admissions”, Journal of Applied Science and Computations, Vol.8 No.10 (2021).

[11] Sharma, S. K., and A. K. Sharma. "Effect of Bi-Parabolic Thermal and Thickness Variation on Vibration of Visco-Elastic Orthotropic Rectangular Plate." Journal of Advanced Research in Manufacturing, Material Science and Metallurgical Engineering 1.2 (2014): 26-38.

[12] Khanna, A., A. Kumar, and M. Bhatia. "A Computational Prediction on Two Dimensional Thermal Effects on Vibration of Visco-Elastic Square Plate of Variable Thickness." Presented and Published in Proceeding of Coniaps Xiii (2011).

[13] Kumar Sharma, A., and S. K. Sharma. "Vibration computational of visco-elastic plate with sinusoidal thickness variation and linearly thermal effect in 2D." Journal of Advanced Research in Applied Mechanics & Computational Fluid Dynamics 1.1 (2014).

[14] Jaichandran, R., Krishna, S. H., Madhavi, G. M., Mohammed, S., Raj, K. B., & Manoharan, G. (2023, January). Fuzzy Evaluation Method on the Financing Efficiency of Small and Medium-Sized Enterprises. In 2023 International Conference on Artificial Intelligence and Knowledge Discovery in Concurrent Engineering (ICECONF) (pp. 1-7). IEEE.

[15] Manoharan, G., Durai, S., Rajesh, G. A., & Ashtikar, S. P. (2023). Credit and Risk Analysis in the Financial and Banking Sectors: An Investigation. In Artificial Intelligence for Capital Markets (pp. 57-72). Chapman and Hall/CRC.