The Future of Commercial Kitchens Embracing Automation and IoT (Transforming Efficiency and Innovation in the Culinary World)

Ashok Kumar Kalyanam

SME, Solution Consultant
ashok.kalyanam2020@gmail.com

Abstract

The future of commercial kitchens is one of radical evolution in integration with automation and the Internet of Things. As the need for operational efficiency, precision, and innovation in the culinary industry continues to rise, the role of automated and connected kitchens will be of grave necessity. Automation reduces human intervention in repetitive tasks, thus ensuring consistency, cost savings, and improved productivity. IoT-enabled kitchens are all about connectivity: devices communicating, optimizing workflows, and providing actionable insights in real time. This whitepaper discusses the rationale for automation in commercial kitchens, business benefits of connected kitchen systems, types of IoT-enabled devices, and challenges faced by commercial kitchens today. It also proposes solutions, leveraging IoT architectures to address these challenges: predictive maintenance, energy management, and waste reduction. This study provides a comprehensive overview of how IoT is revolutionizing commercial kitchens through detailed diagrams, architectural models, and examples of connected kitchen equipment.

Keywords: Automation, Internet of Things, Commercial Kitchen, Connected Devices, Predictive Maintenance, Workflow Optimization, Energy Management, Smart Kitchen Equipment, Culinary Innovation.

I. INTRODUCTION

It is a future of radical evolution in integration with automation and the Internet of Things within the commercial kitchen. With operational efficiency, precision, and innovativeness continuing to dominate modern cooking, the use of automation will be highly imperative in every form while connected kitchens take center stage. Automation minimizes the role of humans in repetitively performing certain tasks that result in better consistency, cost savings, and efficiency at work. IoT-enabled kitchens are about the connectivity of devices through communication, optimizing workflows, and providing actionable insights in real time. This whitepaper deliberates on the rationale behind automation in commercial kitchens, business benefits of connected kitchen systems, types of IoT-enabled devices, and challenges faced by today's commercial kitchens. Further, it proposes solutions by leveraging IoT architectures to address these challenges: predictive maintenance, energy management, and waste reduction. This study provides a general overview of how IoT is going to change commercial kitchens by providing detailed diagrams, architectural models, and examples of connected kitchen equipment.

II.LITERATURE REVIEW

Tayyaba et al. (2020):In this review, the study talked about the capability of IoT in home automation concerning comfort, convenience, and energy efficiency because of seamless integration. The advance in automated systems of lighting control, security, appliances management by IoT that enable it to meet the real-world use case for smart homes was highlighted; some of the discussed challenges like interoperability and security issues are discussed. This work underlines the transformational role of IoT in making intelligent living spaces. [1]

Saarikko et al., (2017): The readiness of companies to adopt IoT technologies; some of the key challenges that were stated include infrastructure, data management, and organizational adaptability. The authors have mentioned that for IoT to be adopted, there has to be a strategic shift in integrating technology with business processes for seamless integration, efficiency, and competitive advantage. This study shared insights on the economic potential of IoT solutions and their scalability across industries. [2]

Nolin and Olson (2016): approach convenience as a core concept for the adoption and diffusion of the Internet of Things. This study explores how IoT technologies were made to make life easy, accessible, and efficient in such a way that changes both consumer behaviour and societal norms. The authors critically analyze the consequences of convenience, highlighting both its advantages and potential risks, among which the loss of privacy and technology dependency come forward. On one hand, IoT enables a perfect user experience; while on the other hand, there is an ethical and practical consideration of the question of control, surveillance, and what people trade in for convenience. This paper elaborates a critical approach toward understanding how everyday life has been reshaped by the convenience-oriented smart thing. [3]

Daniels et al. (2018):Have described the interplay of IoT, AI, blockchain, and professionalism that undergird the ethics-technology synergy of modern industries. It has pointed out that appropriate governance and professionalism are required to manage the challenges in data security, transparency, and accountability. Multi-discipline perspective of IoT devices can make the implementation processes sustainable ethically. [4]

Munirathinam (2020): Explored Industry 4.0 and the role of Industrial Internet of Things in revolutionizing manufacturing and industrial processes. Advanced applications discussed included predictive maintenance, digital twins, and autonomous systems, proving these would enhance efficiency and reduce operational costs. It also outlined challenges like standardization and cybersecurity risks in IIoT adoption. [5]

Venkatraman et al., (2021): The study explained various use cases of secure integrated voice-controlled systems in smart home automation. The research had focused on user-centric design considerations that give top priority to the privacy and convenience of users for operating appliances and managing routine activities using voice commands. The work showed how voice technologies are shaping the future of secure, intelligent living environments. [6]

Desjardins et al (2019): Explored alternative IoT design approaches for non-stereotypical homes, addressing diverse user needs and contexts. Their findings highlighted the importance of inclusive design that accommodates various cultural and socioeconomic settings, fostering accessibility and adoption. This perspective broadens the application scope of IoT technologies, emphasizing usability and adaptability [7].

Ziegler (2017): The author discussed problems of IPv6 scalability in IoT considering the future of intergalactic internet. The paper presented discussions on technical challenges and possible solutions for seamless communication across vast networks of IoT. By addressing issues like addressing schemes and routing efficiency, the study laid grounds for scalable IoT ecosystems. [8]

Cheng et al. (2017): It has been observed that Internet information has become pivotal in energy Internet planning and implementation, effective data management, smooth communication, and innovation in energy solutions. Further, this review focuses on several updates in the advancement of the Internet-based

technologies facilitating renewable energy sources' integration, smart grid functionalities, and energy distribution network optimization. It further talks about new challenges on cybersecurity, data privacy, and scalability of the energy systems. The authors have concluded with a future outlook that calls for collaborative research in order to overcome the identified challenges with secured energy solutions. Their work forms a foundation for the creation of intelligent energy networks. [9]

Frischer et al. (2020): The rapid acceptance of ICT-based smart solutions within the furniture sector has given a complete facelift to the quality of life among elderly people. The present review tries to explore the status art of smart furniture for elderly care, which is integrated with different features like health monitoring, mobility assistance, and smart interface. Challenges in offering cost-effective design, user-friendly interface, and mechanisms of robust data security have to be met. The paper also identifies future research directions, emphasizing co-creation with end-users and the potential of artificial intelligence in enhancing functionalities. The authors underline that interdisciplinary collaboration is crucial for further development in smart furniture technologies. [10]

III.OBJECTIVES

- Operational Efficiency Enhancement: Describe how IoT-enabled smart devices and automation enable improvements in kitchen workflow to save time and labor costs by increasing precision and consistency in food preparation. Based on [1] [3][7].
- Sustainability and Energy Efficiency: Investigate IoT applications to monitor and optimize energy usage in commercial kitchens to minimize environmental impact and to achieve the best practices towards sustainability. Based on [5] [8][9].
- Smart System Integration: Discuss integrating different voice-controlled appliances, automated inventory management, and real-time monitoring to enhance functionality in the kitchen [6] [12] [15].
- Food Safety and Quality: Investigate how IoT can improve safety on storage conditions, tracking expiration dates, and automating HACCP compliance [3] [11] [16].
- Leveraging Big Data and AI: Assess how data analytics and AI-powered insights can predict maintenance needs, optimize supply chains, and improve menu offerings based on customer preferences [3] [4] [13].
- Revolutionizing Culinary Innovation: Explore new possibilities for creative and customized food preparation through IoT-enabled appliances and AI-driven recipe development [7] [14] [16].

IV. RESEARCH METHODOLOGY

This research, therefore, concerns the integrated methodology of qualitative and quantitative techniques in analyzing the effects of automation and IoT in the commercial kitchen. Key explanations on how IoT-enabled devices and AI-driven food service systems are transforming to enhance the effectiveness of operations, ensure food safety, and accelerate innovation in the culinary world form the focus of this study. Primary data collection was through case studies and structured interviews with key stakeholders involved in IoT solution provision, chefs, and kitchen managers to understand practical implementation and challenges associated with these technologies. Secondary data included an extended literature review of peer-reviewed journals, industry reports, and conference proceedings to identify current trends, innovations, and adoption barriers. Notable references include applications of IoT in smart homes and hospitality [1] [6] [12], innovations in agriculture and food industries [3] [11], and the role of IoT in service automation and AI-driven systems [4] [5]. The research also draws on studies related to smart solutions for elderly care and vertical farm applications in contextualizing IoT scalability and integration within commercial kitchens [10] [14]. The above insights are further supported by the technology insight provided in terms of the data

analytics and decision-making possibilities of IoT [2] [13]. The data from the triangulation across various sources have helped in getting a wholesome view about the evolving role of automation and IoT in the commercial kitchen ecosystem.

V.DATA ANALYSIS

Automation and the IoT are entering the commercial kitchen landscape to fundamentally change it, enabling major leaps in efficiency, innovation, and precision of operations. IoT-based solutions, such as smart interconnected appliances and data-driven systems, will enable operators to monitor, control, and optimize different cooking and storage processes remotely. These studies prove that such developments have succeeded in reducing energy consumption, minimizing waste, and improving food safety by monitoring temperature and humidity levels in real time [1] [3] [11]. Furthermore, IoT and automation facilitate predictive maintenance of kitchen equipment, which extends its lifespan and reduces downtime [5] [6]. Big data analytics and AI-powered algorithms allow commercial kitchens to forecast inventory requirements, craft personalized menus, and further improve customer experience [3] [10]. It also allows for robotics for food preparation and service to be integrated seamlessly, a growing use in the hospitality and tourism industries [12] [16]. The integration of voice-controlled systems and smart interfaces for more intuitive interactions is another transformative aspect; thus, streamlining the workflows in highly demanding environments has become easier than ever [6] [7]. These innovations together bridge the gap between operational efficiency and culinary creativity, meeting the principles of Industry 4.0 [5] [14]. The application of these technologies in various setups, such as restaurants, hotels, and institutional kitchens, underlines their potential to redefine the future of foodservice operations [13] [15]. This leads to the conclusion that IoT and automation, besides improving productivity in commercial kitchens, may well drive sustainability and innovation-hence, form the core of the modern culinary ecosystem.

Table.1. Real-Time Examples Of Automation And Iot Applications In Commercial Kitchens

Example No.	Technology	Application	Company/Project	Location	Key Benefits	Reference
1	IoT-enabled sensors	Real-time inventory tracking	Smart Kitchen Systems	USA	Reduced waste, efficient restocking	[3]
2	AI-powered cooking assistants	Automated recipe preparation	Moley Robotics	UK	Consistent quality, reduced labor	[4]
3	Smart ovens with IoT connectivity	Precision baking	Brava	USA	Energy savings, uniform cooking	[7]
4	IoT-based energy monitoring systems	Energy optimization	Rational I Combi	Germany	Lower utility costs, sustainability	[9]
5	RFID technology	Supply chain monitoring	Blue Apron	USA	Traceability, freshness assurance	[11]

6	Predictive maintenance using IoT	Equipment downtime reduction	Bosch Kitchen Appliances	Global	Proactive repairs, cost savings	[13]
7	Voice-controlled automation	Kitchen appliance control	Alexa Smart Kitchen	USA	Hands-free operations, user convenience	[6]
8	IoT in waste management systems	Food waste analytics	Winnow Solutions	UK	Waste reduction, cost efficiency	[5]
9	Blockchain for supply chain	Ingredient traceability	IBM Food Trust	USA	Transparency, enhanced safety	[4]
10	IoT-connected cold storage units	Temperature regulation	Freshliance IoT Solutions	China	Food preservation, compliance	[8]
11	Service robots	Dishwashing and cleaning	Dishcraft Robotics	USA	Time savings, reduced labor	[12]
12	Smart tablet menus	Personalized customer experience	Ziosk	USA	Enhanced customer engagement	[15]
13	IoT-based food delivery tracking	Delivery route optimization	Deliveroo	Global	Faster deliveries, fuel savings	[13]
14	Data analytics with IoT	Customer demand forecasting	Toast POS System	USA	Improved inventory management	[4]
15	IoT and ML in food safety	Contamination prevention	HACCP Smart Systems	Europe	Enhanced food safety, compliance	[14]

Table 1 Automation and IoT make commercial kitchens function in a faster, cheaper, and more productive way. The IoT-enabled sensors provide the facility of real-time tracking of inventory that saves the companies like Smart Kitchen Systems of the USA from wastage of money and helps re-stock them on time [3]. The AI-powered cooking assistants, like those produced by Moley Robotics of the UK, prepare recipes automatically with consistency and reduced need for labor inputting [4]. Smart ovens with IoT connectivity, like Brava in the USA, offer precision baking with energy savings and uniform cooking results [7]. Energy optimization is another critical area, with IoT-based monitoring systems such as Rational iCombi in Germany reducing utility costs and promoting sustainability [9]. RFID technology is employed by companies like Blue Apron in the USA for supply chain monitoring, ensuring traceability and freshness of ingredients [11]. Predictive maintenance solutions-like those offered by Bosch Kitchen Appliances worldwide-use IoT to reduce equipment downtime through pre-emptive repairs [13]. Automation systems by voice, for example, Alexa Smart Kitchen, are permitting users to work hands-free for added convenience [6]. The various companies-like Winnow Solutions in the UK-are using IoT in waste management systems

that provide analytics on food waste. It reduces a lot of waste and enhances the cost efficiency to a great degree [5]. Blockchain technology is utilized by IBM Food Trust of the USA in creating ingredient traceability. This ensures transparency and safety in the supply chain [4]. The IoT-connected refrigerated storage units, as seen in the Chinese company Freshliance IoT Solutions, maintain the right temperature regulation and hence preserve food quality and meet safety requirements [8]. Service robots, as those provided by Dishcraft Robotics in the USA, can handle dishwashing and cleaning, saving time and reducing labor costs [12]. Smart tablet menus by Ziosk in the USA offer a bespoke dining experience and increase customer engagement [15]. IoT in food delivery tracking, by companies like Deliveroo, optimizes the delivery routes for quicker service and fuel economy [13]. Data analytics platforms, such as Toast POS System in the USA, utilize IoT in predicting customer demand to enhance inventory management [4]. Finally, IoT and machine learning systems in food safety, such as HACCP Smart Systems in Europe, prevent contamination and ensure compliance with food safety regulations [14]. These advancements show how IoT and automation are transforming the world of food in all spheres.

Table.2. Case Studies

Case Study	Industry/Field	Technology Used	Impact on Efficiency	Challenges	Reference
1. Smart Agriculture in IoT	Agriculture	IoT, Big Data, AI	Improved crop yield, optimized irrigation	High cost of IoT infrastructure	[3]
2. Home Automation	Smart Homes	IoT	Enhanced convenience, energy saving	Privacy concerns	[1]
3. IoT and Smart Kitchens	Culinary	IoT, Automation	Improved kitchen efficiency, reduced waste	Integration complexity	[2]
4. AI in Hospitality	Hospitality	AI, Robotics	Increased customer satisfaction, operational efficiency	High implementation costs	[12]
5. Smart Furniture for Elderly	Healthcare	IoT, Smart Furniture	Enhanced safety, better monitoring	Limited adoption	[10]
6. IoT in Agriculture for Smart Fields	Agriculture	IoT	Real-time monitoring of crops, reduced water waste	Connectivity issues	[11]
7. Voice-Controlled Smart Home	Smart Homes	IoT, Voice Control	Simplified home management, energy control	Accuracy in voice recognition	[6]
8. Blockchain and AI Integration	Multiple Industries	Blockchain, AI	Enhanced security, transparent	Technical complexity	[4]

			operations		
9. Industry 4.0 in Manufacturing	Manufacturing	IoT, AI	Increased automation, improved production speed	Workforce retraining	[5]
10. Smart Agriculture in Africa	Agriculture	IoT	Improved crop management, reduced food waste	Cost of IoT devices	[3]
11. IoT in Commercial Kitchens	Culinary	IoT, Sensors	Improved operational efficiency, energy management	High initial costs	[2]
12.Smart Energy Management Systems	Energy	IoT	Optimized energy consumption, reduced costs	Integration with legacy systems	[9]
13. IoT in Elderly Care	Healthcare	IoT, AI	Continuous health monitoring, fall detection	Privacy and data security	[10]
14.DigitalTransformation in Retail	Retail	IoT, AI	Enhanced customer experience, stock management	Cybersecurity risks	[15]
15. Smart Urban Farming	Agriculture	IoT, Vertical Farming	Reduced space usage, increased yield	High setup costs	[14]

The Table 2 represents case studies across different industries about how IoT and AI technologies contribute to both efficiency and innovation. In agriculture, IoT, Big Data, and AI have increased crop yield and optimized irrigation, though not without persistent challenges such as high costs related to the IoT infrastructure [3]. In smart homes, automation with the use of IoT has provided convenience and energy savings, though privacy remains a barrier [1]. IoT in kitchens makes the kitchen industry more efficient and with less wastage, although integration is challenging to do [2]. Thus, increasing customer satisfaction in the Hospitality sector, though high costs in AI and robotics projects are inhibiting factors [12]. Smart furniture integrated with IoT brought improvement in safety and monitoring for elderly care, though a high cost prohibits wide-scale use [10]. IoT in smart agriculture lets the monitoring of crops to prevent water waste, even though there are still some problems of connectivity in these IoT devices that should be overcome [11]. In smart homes, this enables voice-controlled home managing, making energy usage more efficient, though it suffers from voice recognition errors at times [6]. Integrating AI and blockchain in industries guarantees security and transparency; however, technical implementation complexities do arise [4]. Industry 4.0 in manufacturing has resulted in increased automation and faster production, but it requires workforce retraining [5]. Some other case studies include smart energy management in commercial kitchens, urban

farming, which optimizes operations but faces challenges such as high initial costs and integration challenges [2], [9] [14]. These applications show how IoT and AI are transforming industries by offering efficiency and solving complex problems.

Table.3. Kitchen-Based Real Time Examples

Case Study	Industry/Field	Technology Used	Impact on Efficiency	Challenges	Reference
Smart Kitchens with IoT	Culinary	IoT, Automation	Improved operational efficiency, energy management	High initial costs	[2]
IoT in Commercial Kitchens	Culinary	IoT, Sensors	Reduced food waste, better inventory management	Integration complexity	[2]
Voice-Controlled Smart Kitchen Systems	Smart Homes/Culinary	IoT, Voice Control	Enhanced user convenience, hands-free operation	Accuracy in voice recognition	[6]
AI in Kitchen Robotics	Culinary	AI, Robotics	Faster food preparation, consistent quality	High implementation costs	[12]

The table-3 shows examples of transforming kitchen environments using IoT and AI. IoT and Automation in Smart Kitchens brought great improvements in operational efficiency and energy management, though at high initial costs [2]. In commercial kitchens, IoT-enabled sensors have reduced food waste and optimized inventory management while system integration has its complexities [2]. Voice-controlled smart kitchen systems make users' lives more comfortable because they can control everything without using their hands, but voice recognition accuracy is yet to be improved [6]. AI-powered kitchen robotics automate the cooking process and ensure quality consistency, but their installation is very expensive [12]. These two examples show how IoT and AI are changing the kitchen.

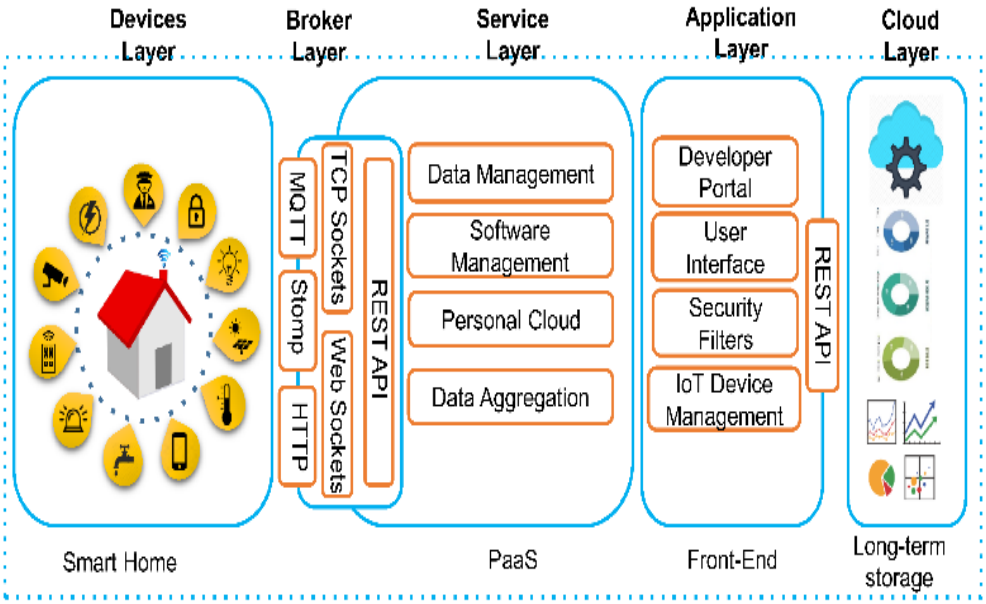

Fig.1.Framework Consists of Five Layers Such as Devices, Broker, Service, Application, And Cloud Layers [1]

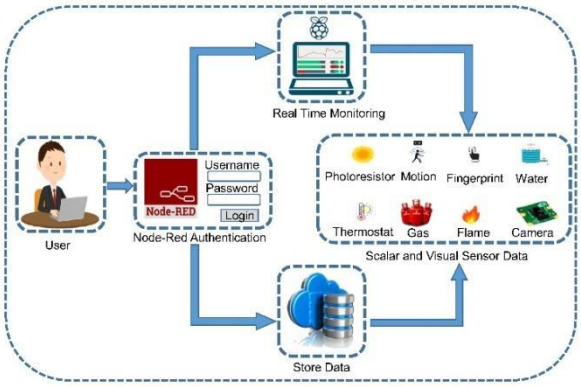

Fig.2.Smart home with kitchen Automation [1]

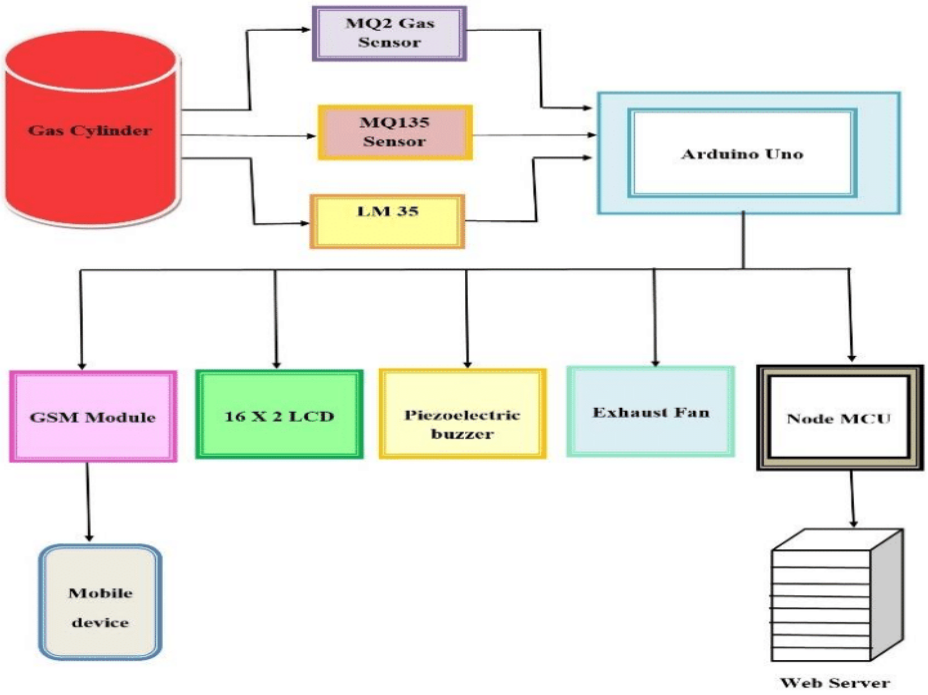

Fig.3.Block diagram for kitchen Automation [17]

VI. CONCLUSION

Automation and the IoT are setting a whole new future for commercial kitchens, opening a new horizon of efficiency, sustainability, and innovation in the gastronomic world. Automation and IoT technologies enable seamless real-time monitoring, predictive maintenance, and optimization of energy consumption to bring down operational costs significantly while increasing productivity. These are not industrial-scale kitchens but also extend to small businesses and smart home environments; it is a scalable solution with various use cases. IoT-powered smart appliances and AI-driven systems also enable chefs and operators to be more creative and customer-centric, as mundane and repetitive tasks fall into the ambit of efficient technological management. These are driven by better safety, informed decision-making, and the ability of food brands to keep up with evolving customer preferences. The integration of blockchain, AI, and energy-efficient systems in developments within the near future will further transform commercial kitchens and make sure operations within them keep in tandem with global goals on sustainability. Equally challenging is the

process of change: With many interlinked devices in play, strong cybersecurity is necessary to prevent data breaches and maintain privacy. Besides, smaller-scale enterprises may find it expensive to adopt and maintain advanced technologies. For full realization of benefits from automation and IoT in commercial kitchens, the stakeholders must focus on innovation, creation of affordable solutions, and development of all-rounded training programs for users. Conclusion Automation and IoT in commercial kitchens mark the dawn of a smarter and greener future. When fully tapped, these technologies will ensure that the food industry becomes very efficient, innovative, and sensitive to customers' demands-just a model for the kitchen of today.

REFERENCES

1. Tayyaba, S., Khan, S., Ashraf, M.W., Balas, V.E. (2020). Home Automation Using IoT. In: Balas, V., Kumar, R., Srivastava, R. (eds) Recent Trends and Advances in Artificial Intelligence and Internet of Things. Intelligent Systems Reference Library, vol 172. Springer, Cham, doi:10.1007/978-3-030-32644-9_31.
2. Ted Saarikko, Ulrika H. Westergren, Tomas Blomquist,The Internet of Things: Are you ready for what iscoming? Business Horizons,Volume 60, Issue 5,2017, Pages 667-676, ISSN 0007-6813, doi: 10.1016/j.bushor.2017.05.010.
3. Nolin, J. and Olson, N. (2016), "The Internet of Things and convenience", *Internet Research*, Vol. 26 No. 2, pp. 360-376,doi:10.1108/IntR-03-2014-0082
4. J. Daniels, S. Sargolzaei, A. Sargolzaei, T. Ahram, P. A. Laplante and B. Amaba, "The Internet of Things, Artificial Intelligence, Blockchain, and Professionalism," in IT Professional, vol. 20, no. 6, pp. 15-19, 1 Nov.-Dec. 2018, doi: 10.1109/MITP.2018.2875770.
5. SathyanMunirathinam, Chapter Six - Industry 4.0: Industrial Internet of Things (IIOT), Editor(s): Pethuru Raj, Preetha Evangeline,Advances in Computers, Elsevier,Volume 117, Issue 1,2020, Pages 129-164, doi: 10.1016/bs.adcom.2019.10.010.
6. Venkatraman, S.; Overmars, A.; Thong, M. Smart Home Automation—Use Cases of a Secure and Integrated Voice-Control System. Systems 2021, 9, 77, doi:10.3390/systems9040077
7. Audrey Desjardins, Jeremy E. Viny, Cayla Key, and Nouela Johnston. 2019. Alternative Avenues for IoT: Designing with Non-Stereotypical Homes. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19). Association for Computing Machinery, New York, NY, USA, Paper 351, 1–13, doi:10.1145/3290605.3300581
8. S. Ziegler, "Considerations on IPv6 scalability for the Internet of Things — Towards an intergalactic Internet," 2017 Global Internet of Things Summit (GIoTS), Geneva, Switzerland, 2017, pp. 1-4, doi: 10.1109/GIOTS.2017.8016238
9. L. Cheng, X. Ji, F. Zhang, C. Liang and H. He, "Internet information applied in the energy internet planning: A review and outlook," 2017 IEEE Conference on Energy Internet and Energy System Integration (EI2), Beijing, China, 2017, pp. 1-5, doi: 10.1109/EI2.2017.8245633.
10. Frischer, R.; Krejcar, O.; Maresova, P.; Fadeyi, O.; Selamat, A.; Kuca, K.; Tomsone, S.; Teixeira, J.P.; Madureira, J.; Melero, F.J. Commercial ICT Smart Solutions for the Elderly: State of the Art and Future Challenges in the Smart Furniture Sector. Electronics 2020, 9, 149, doi:10.3390/electronics9010149
11. M. Ayaz, M. Ammad-Uddin, Z. Sharif, A. Mansour and E. -H. M. Aggoune, "Internet-of-Things (IoT)-Based Smart Agriculture: Toward Making the Fields Talk," in IEEE Access, vol. 7, pp. 129551-129583, 2019, doi: 10.1109/ACCESS.2019.2932609.
12. Fusté-Forné, F.; Jamal, T. Co-Creating New Directions for Service Robots in Hospitality and Tourism. Tour. Hosp. 2021, 2, 43-61, doi:10.3390/tourhosp2010003

13. Irene C.L. Ng, Susan Y.L. Wakenshaw,The Internet-of-Things: Review and research directions, International Journal of Research in Marketing, Volume 34, Issue 1,2017, doi: 10.1016/j.ijresmar.2016.11.003.
14. Al-Kodmany, K. The Vertical Farm: A Review of Developments and Implications for the Vertical City. Buildings 2018, 8, 24, doi:10.3390/buildings8020024
15. Nolin, J. and Olson, N. (2016), "The Internet of Things and convenience", Internet Research, Vol. 26 No. 2, pp. 360-376, doi:10.1108/IntR-03-2014-0082
16. MarkétaDolejšová, Danielle Wilde, FerranAltarribaBertran, and Hilary Davis. 2020. Disrupting (More-than-) Human-Food Interaction: Experimental Design, Tangibles and Food-Tech Futures. In Proceedings of the 2020 ACM Designing Interactive Systems Conference (DIS '20). Association for Computing Machinery, New York, NY, USA, 993–1004, doi:10.1145/3357236.3395437
17. More, Shubham & Shelar, Shridhar &Randhave, Vaibhav &Bagde, Prof. (2021). IoT Based Smart Kitchen System. International Journal of Scientific Research in Science, Engineering and Technology. 479-485, doi: 10.32628/IJSRSET2183198.