

Block chain Technology Applications in the Hotel Industry: A Systematized State-of-Art Review and Evidence-Based Synthesis

Dr. Srinivasa Rao Bandaru^{1*}, Dr. Sujatha Kamepalli²
Dr. K. V. K. Kishore³, Dr. Nannapaneni Chandrasekhrarao⁴

1. * Professor, Department of Management Studies, (VFSTR) Vignan Foundation for Science, Technology and Research, Deemed to be University, Vadlamudi, Guntur District, Andhra Pradesh, India.
2. Associate Professor, Department of Information Technology, (VFSTR) Vignan Foundation for Science, Technology and Research, Deemed to be University, Vadlamudi, Guntur District, Andhra Pradesh, India.
3. Professor and HOD, Department of Information Technology, Dean Library and IT Services, (VFSTR) Vignan Foundation for Science, Technology and Research, Deemed to be University, Vadlamudi, Guntur District, Andhra Pradesh, India.
4. Associate Professor, Department of Business Administration, VR Siddhartha Engineering College, Vijayawada, Krishna District, Andhra Pradesh, Inida..

1. drbsraoprofessormmt10672@gmail.com
2. sujatha101012@gmail.com
3. kishorekvk_1@yahoo.com
4. nannapanenichandra@gmail.com

Abstract

In the digital era, the role of technology in creating disruptions in both the production and service sectors is commendable. Today, Block chain technology (BCT) is a frontrunner in creating disruptions in most of the production and service sectors. Hoteliers are contemplating adopting BCT in their domain. The potential of evidence-based sensible insights of a domain can ignite and illuminate research practice and scope for further research. This paper provides systematized state-of-art review and evidence-based synthesis on applications of BCT to the hotel industry. The review provides extensive evidence-based information on applications of BCT in the hotel industry for the stakeholders for adoption and choice decisions. The findings disclose that majority of the chain hotels are eager about blockchain technology due to more business functions and collaborations. It is obvious that the hotel industry immediately needs to adopt BCT to meet guest customized expectations and enter into the personalization era/Industry 5.0.

Keywords: Blockchain Technology, Applications, Hotel Industry, Systematized Review, Mindmaster software, Evidence Based Synthesis,

1. Introduction

Digital era (Industry 4.0) evolution from automation-digitalisation is disrupting the hospitality industry. Industry 4.0 moves to Industry 5.0 with customer priorities evolved into customization, thus entrepreneur's priorities evolved towards personalization. Hence, meeting guest's expectations through personalization with

applications of disruptive innovations is an immediate priority of the hotel industry. In the 21st century and industry 4.0, Blockchain Technology (BCT) is often reiterating in board rooms and evolved into one of the buzzwords in the domain of disruptive technologies; its scope goes beyond Bitcoin and ethereum. It has the potential to disrupt many industries wish to enter into industry 5.0, and hospitality has no exception [1]. Digital optimization, transformation and innovation have become part and parcel in every angle of industrial revolution 4.0; disruptive technologies such as Artificial Intelligence (AI), Internet of Things (IOT), BCT, Robotics etc., playing a pivotal role in shaping the future of almost each and every sector/economy in the digital era[2, 3, 4, 5].. Hotels continue to place more emphasis on improving guest experiences than increasing efficiency [6, 7]. As guest behaviours, demands and expectations adapted along with disruptions in technology most of the hoteliers prefer to adopt contemporary technology innovations to meet the customised expectations of the guest, but in contemplation to use in day-to-day business applications. It is a good beginning for personalization in the hotel industry through digital transformation [8]. Service quality is the priority to meet expectations and experiences of hotel guest; incorporation of digital DNA into the culture of the hotels ensures not only service quality but also result in competitiveness and agility in the market (Solis, 2018). Hotels need to adapt technology infrastructure to the ever changing expectations of guests [7]. Although BCT disruptive effect is well recognised in various sectors of developed and emerging economies, its applications and implications are understudied in the hospitality industry by policy-makers, managers, consultants, academicians and research communities [9]. This scenario seems to put the hoteliers who under perceived BCT's role in meeting the guest's personalised expectation away from adoption of innovations and competition in the market. Moreover, there is abundant literature on BCT applications on financial services, insurance etc., but very scant in case of especially the hotel industry. This paper is an attempt to systematically/systematized review the applications of BCT in the hotel industry and present implications with evidence based synthesis.

Hotel industry uniqueness lies in the fact that it provides both products and render services at the same time. Advanced digital technology innovations are disrupting both the production and service sectors. Digital advancements adoption influences the service sector in customer engagement and meeting expectations and experiences [10, 11]. BCT applications are gaining momentum in both the production and service sectors. Hotel industry seems service sector, but in reality, it is a combination of both the production and service sectors; mixed/hybrid sector. BCT applications in the business operations of the hospitality industry are increasing day-by-day due to its embedded nature: using blockchain technology along with other disruptive technologies like AI, robots, IoT etc.; the industry can leverage benefits never before it enjoyed [12, 13, 14]. The hotel industry is part and parcel in the hospitality industry. There is scant systematic state-of-art literature review and evidence based synthesis on applications of blockchain technology in hospitality industry exclusively on hotel industry. Hence, this systematic state-of-art-review is a premier attempt to explore the existing literature on blockchain applications exclusively in business operations of the hotel industry; and evidence based synthesis to add more value to the existing little research knowledge in this domain. The review also aims at disseminate untapped potential of applications of BCT as implications to the stakeholders of the hotel industry.

The present paper will help the industry practitioners comprehend the potential impact of BCT on hotel business models. The comprehensive review of applications adds to the hotel industry to see how BCT will disrupt the hotel industry in the new action plan. The findings will support the hoteliers and managers to build up their own methodologies

for taking care of the effect of blockchain selection choices. The paper additionally adds to the hotel industry by examining why BCT is critical to this specific industry.

The organization of this paper is as follows. First, an overview of the advancement of technological disruptions is provided, followed by BCT growing applications in various sectors and scant research on BCT applications and implications in the hotel industry. Thirdly the methodology followed for systematized review and evidence-based synthesis of existing knowledge in the domain for thorough comprehension for different stakeholders in the domain. Next, various BCT applications and their implications are extensively discussed based on evidence synthesis (Graphical Representation of BCT Applications using Mind Map Presented in Figure.1). Finally, limitations, the scope for further research and conclusions are drawn.

2. Methodology

The insights of the literature assessment can light up research exercise and aptly catch scope for further research studies. Systematized reviews result in investigation rigor and find potential scope for further study [15, 16, 17, 18, 19, 20, 21, 22]. This study took in to consideration digital technology expert's opinion and discussion with hoteliers on BCT adoption in the hotel industry. A scientific search is done to locate relevant articles by using the Boolean search. The domain relevant articles are selected for the study using inclusion and exclusion criteria. Scientifically located, selected articles are appraised for quality of review on block chain technology applications in the hotel industry. Potential grey literature also considers the comprehensive and state-of-art review in the hotel domain. The papers, finally, are systematically reviewed and analysed to explore and infer the insights in BCT applications in the hotel industry. BCT applications in various functions are graphically represented using mind master software. The scope for further research is highlighted putting systematized review findings together by following interpretative and narrative approaches for evidence synthesis. Finally, practical conclusions are drawn.

3. Blockchain Technology Applications in Hotel Industry – The Untapped Potential

3. A. Tracking guests: Tracking the guest's movements from his starting point to reaching the hotel, check-in, stay, check-out and reaching his destination is a cumbersome task for hoteliers whereas hoteliers directly or indirectly render services in these stages. Guests may not be willing to allow his physical tracking, but this process highly beneficial for hoteliers to render timely, in-person and tailor-made valuable service to the guest. Even though there are numerous criticisms against guest movement tracking practice with the consent of guest the hoteliers can initiate it at the authentication-cum-benefit of customer privacy. It helps in minimizing waiting time while the check-in and the check-out processes are underway; convenient for the guests to stay and travel in a hassle-free manner. Most of the hoteliers at present using ICT based tools which are not trust worthy in customer privacy point of view. The application of BCT for tracking guest ensures in minimizing guest waiting time and increasing the efficiency of hotelier prompt services, the trust worthy privacy of the guest is possible due to authentication of guest is required [23].

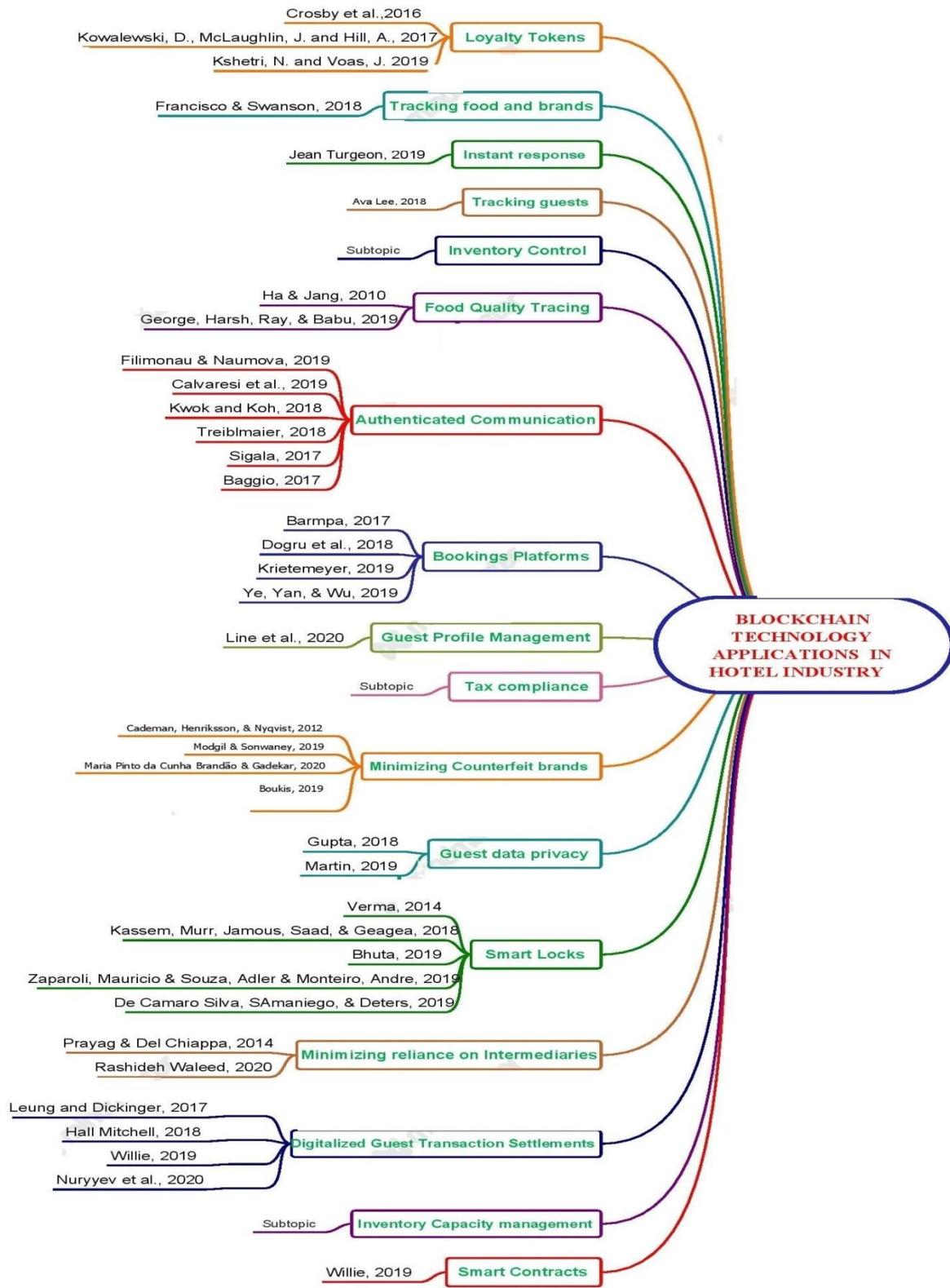
3. B. Instant response: Guests no more look forward to hours to get hold of response/service to their queries/expectations. They demand automatic/quick service

/response for their expectations/queries; their service waiting tolerance capacity diminishing from generation to generation, which is more in the 21st century. Therefore, to give instant answers to guest's routine queries hoteliers embrace technology innovations/disruptions. Moreover, to provide instant services and responses for guest's demands/queries hoteliers should embrace technology innovations and disruptions like robots, chatbots, etc.; next- generation smart application devices transform hotel check-in and check-outs as revenue-generators [24].

3. C. Tracking food and brands: Social sustainability consciousness of guests is tremendously increasing. Brands are considered progressively responsible for their activities while being relied upon to step up their corporate social obligations. Lack of brand transparency create doubt in the quality conscious guests mind and doubt may result in switching over to other concern, in case of difficult situation he may legally proceed. Blockchain application in the production process, service delivery process, supply chain activities gives more information about the brand and result in increased transparency and trust [25].

3. D. Loyalty tokens: Guest traffic management is a challenging task for the hospitality industry. Customer reward programmes help hotels in this regard. Loyalty schemes correlation with programmes loyalty is not always possible, in-turn may result in customer dissatisfaction or losing potential customer. Loyalty tokens are being issued by hotels using asymmetric encryption platforms to reward their loyalty programmes [26]. This can enable the guest to fairly exchange loyalty tokens and service quality of reward programmes [27]. Blockchain empowered loyalty programmes in hotel industry not only incentivize guest but also give them the opportunity to get benefit other industries [28, 29].

3. E. Smart contracts: Contracts strengthen collaborative activities. Nick Szabo, in 1994, first used the term - smart contract. Smart contracts are BCT digital programs embedded with consensus architecture. Smart contracts facilitate the exchange of assets and services in protected digital environment. Smart contracts maintain complete transparency, eliminates intermediaries etc. Smart contracts are highly useful for the hotel industry in inventory, service and production management. The opportunities for the hotel industry to adopt BCT based smart contracts are very high, economics, transparent and trust worthy. BCT can make every hotel contract smart and eliminates the intervention of intermediaries effectively with its core features of immutability, transparency and many more [12].



Source: Primary - Systematised review Comprehension.

Figure1. Mind Mapping of BCT Applications in Hotel Industry

3. F. Inventory capacity management: Inventory management in case of, especially, hotel rooms is very difficult because in the meantime of check-out of in house guest and check-in of joining the housekeeping department should ensure quality in different aspects including hygiene and expectations of the guest [30]. Moreover, the other difficult thing is providing an extension of time for the in house guest or shifting to another room; providing suitable accommodation to the early arrived guest. This practice can be simplified using BCT by prioritizing rooms for different purposes and many more. BCT connects hotels direct to guests by avoiding intermediaries, streamline the business process for better efficiency, personnel satisfaction and result in personalization and customization.

3. G. Digitalized guest transaction settlements: Unlike other production industries, in the hotel industry the guest/customer bills may be paid by himself one on behalf of him his/her friends, relatives, employer, or any other intermediary [12]. Payments made for various services of hotels may be done in different forms such as cash, digital cards, Paytm, and credit or in other forms like digital money/bitcoin. Bitcoin is being used by restaurants sector but suffering from lack of legal guarantee [31]. In order to stay competitive and contemporary, hotels have to accommodate versatile methods of payment the customers prefer [32]. Moreover, BCT based payments not only ensure privacy, safety and security to the customer payment process but also eliminates intermediary as well as saves time/reduce delay and cost in the payment process [12]. [33] examined and discovered that the social and individual attributes have a critical impact on behavioral intention to adopt bitcoin/cryptocurrency payments.

3. H. Smart locks: Security and Privacy of the guest are a high priority for the hospitality industry to satisfy guests expectations. In the process of ensuring security and privacy of guest door locks, play a vital role/contribution. Even though, standard key-based door locks, pin-pad-door locks, RIFD door locking [34, 35, 36] etc., are in use they cannot completely avoid the issues of personal contact, keep on changing passwords, malpractices and fraud in the guest room transactions. Hence, there is a high demand to find a feasible solution to this problem, taking into consideration the satisfying expectations of the guests. In the industrial revolution 4.0, IOT mixed with Blockchain Technology based solutions proposed for smart locking by [37, 38] are more efficient not only in delivering [39], security and privacy expectations of guests but also solving the problems of malpractices, fraud and many more. They used Ethereum blockchain to connect with visitors to keep up first class access to the lock during their remain, gathering that not utilizing all methods the proprietor of the gadget would be competent to open it during that period. They utilized Ethereum blockchain to engage guests to maintain elite access to the lock during their stay. They disclosed that the cost of using this lock is very low whereas set up is expensive.

3. I. Minimizing counterfeit brands: Counterfeit products are offered by the players in the market in the form of duplicate, pirated or fake products to succeed overnight, which cases to heavy damage to customer, brand and many more [40] Guests of most of the hotels generally use luxury brands. Counterfeit products in luxury brands are more and threat to customer confidence [41, 42]. Hence, hotels should adopt contemporary technology which can distinguish original product to counterfeit product to ensure customer confidence and fraud prevention. Through BCT applications, brands can be empowered to minimize the negative impact of counterfeit product consumption in turn, guest perceived risk. It is possible through collaboration with blockchain enabled supply chains [43].

3. J. Guest data privacy: Organisations in the hospitality industry frequently/knowingly demand their customers (knowingly customer is god) for their personal information and identity proofs to meet statutory requirements (guest's arrival and departure) of local, national and international bodies whereas guests are not comfortable in doing so. The main concern of guests is their regard are their data privacy, personal identity theft, documents misuse, and many more. Blockchain technology can resolve these issues and ensure protected guests personal identity and prevent misuse of identity documents by providing unique indent code, which can be used with the permission of guests only, and each usage will be time stamped[44]. Hotels directly provide guests arrival and departure information to the blockchain, so that the regulatory stakeholders naturally get the guest information from the blockchain technology itself [45].

3. K. Tax compliance: The hotel industry render multiple services and provide multiple products with varied fares/fee/charges/tariffs etc., for domestic and international guests, hence, naturally, it attracts multiple taxes from local, national and international authorities. Meeting all these multiple taxes in time is a cumbersome activity whereas even simple delay and small error in payment may result in not only losing reputation but also the wrath of the governing internal and external stakeholders. In addition, identification and payment of multiple tax demands at the right time are humanly impossible. Blockchain technology enables the industry to precisely track multiple tax demands as per the concerned tax authorities' requirements posted in the public blockchain network. Smart contracts ensure in time tax payment, audit and compliance [45].

3. L. Minimizing reliance on intermediaries: Intermediaries play a vital role in the hotel business. They are costly, seasonal and they easily switch their services from one concern to other concerns based on their customer demand and offers prevailed in the market; finally, the majority of the intermediaries unorganised and not trustworthy[46,47]. Intermediaries also indulge in charging both the guests and hoteliers, high service charge for needy and new guests, which are high concerns of the hotel guests and finding ways to circumvent. On the other hand, avoiding these intermediaries is costly for the hotels. Hence there is dire need to minimize the role of intermediaries in the hotel industry. The BCT framework developed by [47] Rashideh Waleed for disintermediation in the tourism domain can be adapted and used for the hotel industry effectively. The rationale behind it is the unique embedded characteristics/capabilities of BCT: decentralization, security, cost reduction and agility.

3. M. Guest profile management: Known guest is amicable than unknown prospects. Hotels always give high priority to retain guests because of satisfying expectations and retaining known guests easier and cheaper than acquiring new guests. In satisfying, transforming the known guests in to loyal guests, customer relationship management as well as managing switching behaviour guest profile highly aids the hoteliers and personnel of the hotel. Guest history provides not only how much he spent but also the pattern of spending behaviour and many more qualitative and quantitative data/information, which is highly useful for predictions and business decisions. If the hoteliers have branches/parts in a chain the guest profile can be used for different units with the authentication of guests. It can also be extended to alliances and collaboration properties[48].

3. N. Bookings platforms: Guest acquisition and its cost reduction is a big challenge for

hoteliers. Hotel booking is relating to revenue operations and distribution channel management domain. In these operations, often, middle-men plays a vital role. In some cases/places, hotels heavily depend on their room bookings on middlemen (for example: online/offline travel/tour agents, etc.). Based on the peak and slack seasons these travel agents charge/expect heavy commission, and/or personal benefits in the form of gifts, free accommodation and dining for their families and near ones. Moreover, encouraging new middlemen to overcome the monopoly of these (existing) middle men is not easy due to the low percentage of entrants in this business. Indirect hotel bookings are not economical and direct bookings are powerful, balance distribution mix strategy is suggested instead of avoiding beneficial middlemen, customer relationship management and safe electronic distribution is highly beneficial [49, 1, 50, 51]. Development and application of blockchain based hotel booking platforms not only minimize the role of intermediaries in the room and other services booking but also increase customer relations, put hotel distribution channel on the strategic path, even though cost matters are there for the development of booking platforms. There is a lot of potential for reducing the marketing budget in the long-run and ensure security for customer payment [50].

3. O. Authenticated communication: Authentic communication with stakeholders - always act as a goodwill building tool for organizations. Contemporary digital media is not in a position to ensure authenticity to guests. Fake reviews can negatively impact business growth and harmful for competitive spirit [29, 52, 53] (Dhwani et al., 2018)(Efthymiou & Orphanidou, 2019) (Calvaresi et al., 2019). BCT applications in hotel communication can ensure authenticity by authenticating customer reviews etc., [54, 55, 56, 57]. It also ensures the economy in the promotion budget of the organizations.

3. P. Food quality tracing: Food security, safety and quality traceability would be the primary concerns in the post-COVID-19 era. service and food quality positively affects both - guest satisfaction and loyalty[58]. Due to the adapting lifestyles and increasing earnings people prefer quality food with authenticity for immunity. The traceability of food products from farm-to-fork (production-to-table) demands technology, transparency, and quality for authenticity. This situation leads to cutthroat competition among supply chains towards the value chain. RFID and Barcoding tools cannot assure food quality. Blockchain seems capable of quality traceability in the life cycle of products and services. It also ensures the economy, standardisation, safety and reliability of product or service information. [59] George et al., developed a Blockchain framework for pork quality tractability served in restaurants which can be used even to examine the genetics of fork served. IBM implementing project, blockchain for Walmart in pork and mango supply in China and US respectively attracting attention of the industry.

3. Q. Inventory control: Rooms, restaurant and bar seating, and allied facilities occupancy rate is vital for the hotel industry. Managing the inventory with full occupancy is a challenging task. Low occupancy rates negatively impact on revenue, customer loyalty, organization growth etc. BCT allows movement of inventory between points of sales to customers; flex selling margins considering the demand. BCT consider the life cycle of guest transaction improves hotel capacity management and mitigates the risk of losing customers in case of narrow check-outs and just cancelled rooms. It ensures an effective business process by notifying the room is ready for sale; and eliminate the tradition of requesting the customer to wait for making the room ready for occupation [60].

In addition to the above, BCT can be effectively adopted in revenue management, bookkeeping, accounting, finance areas of the hotel industry. Application of BCT effectiveness is highly explored in these areas and hence this paper has not concentrated on this domain.

4. Evidence-Based Synthesis of BCT Applications in Various Activities/Functions of Hotel Industry

Based on the above systematized review of BCT applications in the hotel industry the evidence based narrative synthesis discloses BCT can be effectively implemented in functional areas of the hotel: guest movement tracking [23]; quick response [24]; tracking food and brands [25]; loyalty Tokens [27, 28]; smart contracts [12]; digitalized guest transaction settlements [12, 31, 32, 33, 34, 35, 36, 37, 38]; minimizing counterfeit brands:[40, 41, 42, 43]; guest data privacy [44, 45]; minimizing reliance on intermediaries [46, 47]; guest profile management [48]; bookings platforms [49, 1, 50, 51]; Authenticated Communication [53, 54, 55, 56, 57]. Accounting, financial services and insurance are highly explored and proved areas, hence this paper not concentrated on this domain. The hoteliers should tap the untapped potential of BCT to meet the customized expectations of guests. Academicians, industry, researchers, and consultants should work towards dissemination of real advantages and technicalities of BCT applications in hotel industry.

5. Conclusion

This systematized review presents evidence based narrative synthesis on applications of BCT in the hotel industry. The study results are highly useful for a comprehensive state-of-art understanding of BCT applications for all the stake holders in the hotel industry especially for owners to adopt blockchain initiatives to support the development and execution of strategies that will enhance hotel service efficiency. The study is limited to the hotel industry, whereas examination of allied activities that can directly impact the hotel industry will give more exposure and challenges of applications of BCT technology. There is a lot of scope for further research in this area for empirical and experimental research to find new functional and technical areas in the hotel industry for the application of Blockchain technology. This study overlooked literature on BCT applications in accounting and finance areas which leaves scope for further research. Due to heterogeneous nature of systematic review results narrative synthesis is adopted for evidence based synthesis. Finally, the outcome of this study can create mind map for the stakeholders of the hotel industry to understand, articulate and take further potential decisions.

Acknowledgements: We are very grateful for the cooperation of hoteliers, managers of hotels; experts in Blockchain Technology in Departments IT and CSE, Deans and Management of Vignan Foundation for Science, Research and Technology(VFSTR), Deemed to be University, Vadlamudi, Guntur District, Andhra Pradesh, India, for their encouragement and cooperiton in completion of this article.

References

- [1]. Dogru, T., Mody, M., & Leonardi, C., Blockchain Technology & its Implications for the Hospitality Industry. *Boston Hospitality Review*, Winter, (2018), pp. 1–12.
- [2]. Havle, C. A., & Ucler, C., Enablers for Industry 4.0. *ISMSIT 2018 - 2nd International Symposium on Multidisciplinary Studies and Innovative Technologies, Proceedings*, (2018), pp. 1–6. <https://doi.org/10.1109/ISMSIT.2018.8567293>
- [3]. Bandaru, S. R., & Kamepalli, S. (2019). Artificial intelligence: applications, framework and concerns-BFSI. *Journal of Advanced Research in Dynamical and Control Systems*, 11(9), (2019), pp. 1–11. <https://doi.org/10.5373/JARDCS/V11I9/20192766>
- [4]. Kamepalli, S., & Rao, B. S., Recent applications of machine learning: A survey. *International Journal of Innovative Technology and Exploring Engineering*, 8(6 C2), (2019), pp. 263–267.
- [5]. Ivanov, S., The impact of automation on tourism and hospitality jobs. *Information Technology and Tourism*, (2020). <https://doi.org/10.1007/s40558-020-00175-1>
- [6]. Alactel, Hospitality Digital Transformation Survey Outlook 2020 : Trajectory , Challenges. Retrieved from <https://www.al-enterprise.com/-/media/assets/internet/documents/hospitality-survey-en.pdf>
- [7]. Veerakumaran, B., Yau, E. C. C., & Hussain, K., Service innovation: unfolding the future for the hospitality industry through touch points. 14(May), (2017), 67–75. Retrieved from [http://www.myjournal.my/filebank/published_article/58111/6.pdf%0Ahttp://www.myjournal.m y/public/article-view.php?id=109054](http://www.myjournal.my/filebank/published_article/58111/6.pdf%0Ahttp://www.myjournal.my/public/article-view.php?id=109054)
- [8]. Büyüközkan, G., Feyzioğlu, O., & Havle, C. A., Intuitionistic fuzzy AHP based strategic analysis of service quality in digital hospitality industry. *IFAC-PapersOnLine*, 52(13), (2019), pp. 1687–1692. <https://doi.org/10.1016/j.ifacol.2019.11.443>
- [9]. Lam, C., & Law, R., Readiness of upscale and luxury-branded hotels for digital transformation. *International Journal of Hospitality Management*, 79, (April, 2018), pp. 60–69. <https://doi.org/10.1016/j.ijhm.2018.12.015>
- [10]. Jo, O. P. E. N., & Nal, U. R., . Technological disruptions in Services: lessons from Tourism and Hospitality. *Journal of Service Management*, (2015), pp.1–14. Retrieved from [https://dora.dmu.ac.uk/bitstream/handle/2086/17630/Pre Publication ver JOSM 2019.pdf?sequence=1](https://dora.dmu.ac.uk/bitstream/handle/2086/17630/Pre_Publication_ver_JOSM_2019.pdf?sequence=1)
- [11]. Helkkula, A., Kowalkowski, C., & Tronvoll, B., Archetypes of Service Innovation: Implications for Value Cocreation. *Journal of Service Research*, 21(3), (2018), pp. 284–301. <https://doi.org/10.1177/1094670517746776>
- [12]. Willie, P., Can all sectors of the hospitality and tourism industry be influenced by the innovation of Blockchain technology? *Worldwide Hospitality and Tourism Themes*, 11(2), (2019), 112–120. <https://doi.org/10.1108/whatt-11-2018-0077>
- [13]. Connects, W. E., Hospitality in a digital world. (July, 2017)
- [14]. Oracle., Hotel 2025: Emerging Technologies destined or reshape our business. *Hospitality Technologies* (2017).
- [15]. Grant, M. J., & Booth, A., A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal*, 26(2), (2019), pp. 91–108. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>
- [16]. Briner, R. B., & Denyer, D., Systematic Review and Evidence Synthesis as a Practice and Scholarship Tool. *The Oxford Handbook of Evidence-Based Management*, (January,2012). <https://doi.org/10.1093/oxfordhb/9780199763986.013.0007>
- [17]. Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G., Academia and Clinic *Annals of Internal Medicine Preferred Reporting Items for Systematic Reviews and Meta-Analyses: Annals of Internal Medicine*, 151(4), (2009), pp. 264–269.
- [18]. Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines.

- Journal of Business Research, 104 (March, 2019), pp. 333–339.
<https://doi.org/10.1016/j.jbusres.2019.07.039>
- [19]. Davies, P., The Relevance of Systematic Reviews to Educational Policy and Practice. Oxford Review of Education, 26(3–4), (2000), pp. 365–378. <https://doi.org/10.1080/713688543>
- [20]. Davis, J., Mengersen, K., Bennett, S., & Mazerolle, L. (2014). Viewing systematic reviews and meta-analysis in social research through different lenses. *SpringerPlus*, 3(1), (2014). <https://doi.org/10.1186/2193-1801-3-511>
- [21]. Hammersley, M., Systematic Reviews in Educational Research. In *Systematic Reviews in Educational Research* (2020). <https://doi.org/10.1007/978-3-658-27602-7>
- [22]. Of, O., What is Evidence-Based Educaiton? (1999), pp.108–121.
- [23]. Ava Lee, 9 Ways Blockchian Technology is Emerging as A Game-Changer in The Hotel Industry (2018), <https://www.hospitalitynet.org/opinion/4089217.html>
- [24]. Jean Turgeon, Digital Disruption in Hospitality: Seven Top Technology Applications (2019), <https://hospitalitytech.com/digital-disruption-hospitality-seven-top-technology-applications>
- [25]. Francisco, K., & Swanson, D., The Supply Chain Has No Clothes: Technology Adoption of Blockchain for Supply Chain Transparency. *Logistics*, 2(1),(2018), p. 2. <https://doi.org/10.3390/logistics2010002>
- [26]. Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V., Blockchain technology: Beyond bitcoin. *Applied Innovation*, (2), (2016), pp. 6-10.
- [27]. Kshetri, N. and Voas, J., “Online Advertising Fraud”, *Computer*, Vol. 52 No. 1, (2019), pp. 58-61.
- [28]. Kowalewski, D., McLaughlin, J., & Hill, A. Blockchain will transform loyalty programs. *Harvard Business Review*(2017), Retrieved from <https://hbr.org/2017/03/blockchain-will-transform-customer-loyalty-programs>.
- [29]. Dhvani Agrawal, Natalia Jureczek, Gajane Gopalakrishnan, Margaret Natalie Guzman, Michael McDonald & Henry Kim, Loyalty Points on the Blockchain, *Business and Management Studies* Vol. 4, No. 3; (September, 2018), pp.80-92.
- [30]. Madeleine Pullman and Svetlana Rodgers b, Capacity management for hospitality and tourism: A review of current approaches, *International Journal of Hospitality Management*, 29 (2010) pp. 177–187. <http://dx.doi.org/10.1016/j.ijhm.2009.03.014>
- [31]. Leung D., Dickinger A., Use of Bitcoin in Online Travel Product Shopping: The European Perspective. In: Schegg R., Stangl B. (eds) *Information and Communication Technologies in Tourism 2017*. Springer, Cham, https://doi.org/10.1007/978-3-319-51168-9_53
- [32]. Hall Mitchell (2018), Restaurant Credit Card Processing Charges And Fees 101, <https://upserve.com/restaurant-insider/restaurant-pos-charges-and-fees-101/> Retrieved on 5-5-2020.
- [33]. Nuryyev, G., Wang, Y. P., Achyldurdyyeva, J., Jaw, B. S., Yeh, Y. S., Lin, H. T., & Wu, L. F., Blockchain technology adoption behavior and sustainability of the business in tourism and hospitality SMEs: An empirical study. *Sustainability (Switzerland)*, (2020), pp.12(3). <https://doi.org/10.3390/su12031256>
- [34]. Verma, G. K. (2014). *A Digital Security System with Door Lock System Using RFID Technology*. (June, 2014), 1–4. <https://doi.org/10.5120/957-1334>
- [35]. Bhuta, H. V. and H., Business Management and Administrtrion Keyless Hotel Doors and Smart Check-ins: *Journal of Information , Knowledge and Research in Business*

- Management and Administration, 5(2), (2019), 151–154.
- [36]. Kassem, A., Murr, S. El, Jamous, G., Saad, E., & Geagea, M. (2018). A Smart Lock System using Wi-Fi Security. (July 2016). <https://doi.org/10.1109/ACTEA.2016.7560143>
- [37]. Zapparoli, Mauricio & Souza, Adler & Monteiro, Andre., SmartLock: Access Control Through Smart Contracts and Smart Property(2019). 10.1007/978-3-030-14070-0_16.
- [38]. De Camargo Silva, L., Samaniego, M., & Deters, R.,. IoT and Blockchain for Smart Locks. 2019 IEEE 10th Annual Information Technology, Electronics and Mobile Communication Conference, IEMCON 2019, 262–269. <https://doi.org/10.1109/IEMCON.2019.8936140>
- [39]. AH de Oliveira Monteiro, AD de Souza, BG Batista, M Zapparoli, Market prediction in cryptocurrency: A systematic literature mapping, Proceedings of the XV Brazilian Symposium on Information Systems, (2019), pp. 1-8.
- [40]. Modgil, S., & Sonwaney, V. (2019). Planning the application of blockchain technology in identification of counterfeit products: Sectorial prioritization. IFAC-PapersOnLine, 52(13), (2019), 1–5. <https://doi.org/10.1016/j.ifacol.2019.11.080>
- [41]. Cademan, A., Henriksson, R., & Nyqvist, V., The Affect of Counterfeit Products on Luxury Brands. Linnaeus University, (2012), 3. Retrieved from <http://www.diva-portal.org/smash/get/diva2:530386/fulltext01.pdf>
- [42]. Maria Pinto da Cunha Brandão, A., & Gadekar, M., The Counterfeit Market and the Luxury Goods. Fashion Industry - An Itinerary Between Feelings and Technology, (May, 2020). <https://doi.org/10.5772/intechopen.86479>
- [43]. Boukis, A., Exploring the implications of blockchain technology for brand–consumer relationships: a future research agenda. Journal of Product and Brand Management, 29(3), (2019), 307–320. <https://doi.org/10.1108/JPBM-03-2018-1780>
- [44]. Martin, B. (2019). Blockchain : A Welcome Change for the Hospitality Industry. In NTT Data Services, Inc, (2019). .
- [45]. Gupta, M., Blockchain for Hospitality. John Wiley & Sons, Inc, 2, (2018), pp. 44. <https://doi.org/10.1002/app.45263>
- [46]. Prayag, G., & Del Chiappa, G., Hotel disintermediation in France: perceptions of students from Generation Y. Anatolia, 25(3), (2014), 417–430. <https://doi.org/10.1080/13032917.2014.902386>
- [47]. Rashideh, W. , Blockchain technology framework: Current and future perspectives for the tourism industry. Tourism Management, 80(November 2019), 104125. <https://doi.org/10.1016/j.tourman.2020.104125>
- [48]. Line, N. D., Dogru, T., El-Manstrly, D., Buoye, A., Malthouse, E., & Kandampully, J. (2020). Control, use and ownership of big data: A reciprocal view of customer big data value in the hospitality and tourism industry. Tourism Management, 80(October 2019), 104106. <https://doi.org/10.1016/j.tourman.2020.104106>
- [49]. Barmpa, A., How can a Hotel increase its Direct bookings ? The Case Study of a Hotel in Bulgaria. (December, 2017), pp. 1–55.
- [50]. Krietemeyer, M. Blockchain Technologies ' Influence on Hotel Bookings (2019).
- [51]. Ye, F., Yan, H., & Wu, Y., Optimal online channel strategies for a hotel considering direct booking and cooperation with an online travel agent. International Transactions in Operational Research, 26(3), (2019), pp. 968–998. <https://doi.org/10.1111/itor.12470>
- [52]. Efthymiou, L., & Orphanidou, Y. (2019). The Latest from The Tourism Front: Technology Innovation and The Tourism Front, May, 2019.
- [53]. Calvaresi, Davide, Leis, Maxine, Dubovitskaya, Alevtina, Schegg, Roland and Schumacher, Michael, Trust in Tourism via Blockchain Technology: Results from a Systematic Review: Proceedings of the International Conference in Nicosia, Cyprus, January 30–February 1, 2019. DO - 10.1007/978-3-030-05940-8_24

- [54]. Filimonau, V., & Naumova, E., The blockchain technology and the scope of its application in hospitality operations. *International Journal of Hospitality Management*, (September, 2019). <https://doi.org/10.1016/j.ijhm.2019.102383>
- [55]. Andrei O. J. Kwok & Sharon G. M. Koh, Is blockchain technology a watershed for tourism development?, *Current Issues in Tourism*, 22:20, (2018), pp. 2447-2452.
DOI: 10.1080/13683500.2018.1513460
- [56]. Treiblmaier, H. (2018), "The impact of the blockchain on the supply chain: a theory-based research framework and a call for action", *Supply Chain Management*, Vol. 23 No. 6, pp. 545-559. <https://doi.org/10.1108/SCM-01-2018-0029>
- [57]. Colombo, E., & Baggio, R., Tourism distribution channels: Knowledge Requirements. *Bridging Tourism Theory and Practice*, 8, (2019), pp. 289–301.
<https://doi.org/10.1108/S2042-144320170000008016>
- [58]. Ha, J., & Jang, S. C., Effects of service quality and food quality: The moderating role of atmospherics in an ethnic restaurant segment. *International Journal of Hospitality Management*, 29(3), (2010), 520–529. <https://doi.org/10.1016/j.ijhm.2009.12.005>
- [59]. George, R. V., Harsh, H. O., Ray, P., & Babu, A. K., Food quality traceability prototype for restaurants using blockchain and food quality data index. *Journal of Cleaner Production*, (2019). <https://doi.org/10.1016/j.jclepro.2019.118021>
- [60]. Max Starkov, *Debunking the Impact of Blockchain on Hotel Distribution* (2018), <https://www.hospitalitynet.org/opinion/4088843.html>