A REVIEW PAPER ON THE FEASIBILITY OF RFID DATA TECHNOLOGY UTILIZATION

Hamza Danladi, Sudan University of Science and Technology
G.K. Viju, Sudan University of Science and Technology
Abdalrahman Alamin, Sudan University of Science and Technology

ABSTRACT

There have been various published papers that discuss the feasibility of Radio Frequency Identification (RFID) data Technology Utilization. But in most cases, reviewing these articles end with an establishing research gaps that allows for further research. An imperative aspect of this paper is to find out research gaps in various published papers through a critical review and place it under a new perspective. The review uses the Preferred Reporting Item for Systematic Reviews and Meta-Analysis (PRISMA), and uses the three databases (Science Direct, Google Scholars and Scopus) from January 2010 to December 2020. The database and timeframe are preferred because the collected articles have passed the comprehensive resources of research report data, quality control process and analysis. As many as 312 articles were reduced to 21 articles to meet the criteria of this research. A total of sixteen (16) papers were critically reviewed in which five (5) were from areas of students' management, four (4) from areas of construction management, three (3) from waste management area and four (4) from transport and aviation management area. In addition, based on the thematic analysis, another sub-theme emerged from these key reviews to match the use of RFID data (Internet of Things) and this has led to the development of a systematic and sustained study on it. However, findings from critical literature review reveals that research gaps existed in all the papers that discuss the feasibility of RFID data utilization.

Keywords: Feasibility, Review, RFID data, Technology, Utilization.

INTRODUCTION

This paper is based on a critical review of the feasibility of utilizing Radio Frequency Identification (RFID) data Technology in areas students' management, construction management, waste management and transport and aviation management. RFID refers to *"wireless data capture technology that uses radio frequency (RF) waves to automatically identify objects"* (Preradovic & Karmakar, 2010). Khairul Azizan & Nazatul Shima (2013) defined RFID data Technology as *"a small tag containing an integrated chip circuit and an antenna, which will respond to radio waves sent from an RFID reader, which serves as a transmitter, processor and information storage"*. Landt (2005) defined RFID data Technology as *"a term used to transmit digital information between a fixed location and a movable object or between short-distance radio technologies that mainly transmits digital information."*

RFID data Technology is conceivably one of the most pervasive technologies in history Peris-Lopez et al. (2016) and it has been utilized in various areas that include for example individual product parking and e-passports and demonstrated an overall improvement. However, this paper is concern with the critical review of previous studies on RFID data utilization. By

means of this review, research gaps will be identified and explained as well as recommendations for further studies. Thus, the paper will critically look at the feasibility of RFID data utilization from four different areas: 1) Students' management, 2) construction management, 3) waste management, and 4) transport and aviation management and then end with discussions of findings, followed by the conclusion.

Feasibility Study of RFID Data Technology Utilization in Students' Management

In a review by Vimal et al. (2015) on *"Secure Attendance Management System Using RFID Technology"*, attempted to solve the problems of delay related to manual method of gathering class room lecture attendance in developing countries via an RFID utilization affixed at the entrance of the students' lecture class room. Result showed a considerable improvement compared to manual technique of students' attendance. However, finding of this paper lack some evidences on the risk of impersonation by other students. Because the paper is more focus on using RFID technology to improve the problem of manual technique of collecting attendance during the class room lecture without considering that, an impersonator can steal a student's identity card or any other means of identification needed by RFID technology to recognize attendance. This therefore necessitates further study on how to tackle the issue of impersonation during the process of gathering the class room attendance using RFID technology.

Ouakasse & Rakrak (2017) in their published paper entitled "*Towards an approach using RFID in high schools and universities*". The authors were more detailed towards the feasibility of using RFID technology as a new approach in high schools and universities. Their new approach was developed using RFID tags integrated in students' smart phones for gathering facts from students. The authors went further to explain how RFID tags work in conjunction with the students' smart phones and how information is transmitted and stored in the data ware house. However, the paper concluded that utilization of this new approach via RFID tags and smart phones would contribute to the development and progress of high schools and universities. This paper is criticizing by not explaining in details the stability of a network which enables the transmission of students' information. Based on the knowledge of the disagreement, the technology of RFID tags and smart phones depends on a network in exchanging information. Therefore, future studies are needed on RFID tags and smart phones network stability in gathering students' information in high schools and universities.

In their paper on the *"Implementation of Student Safety System Using RFID",* focused on developing a system that will protect children against crime while going to school. This will be done through checking and detecting a child that has not arrived in the school and then distribute an alert message to this cause as well as enable parents to log into the system website and monitor the details of their children. The results of the study showed that execution of student safety based on RFID technology utilization plays a vital role in protecting student from high rate of kidnapping. The paper provides insights into why the utilization of RFID-based detection might deliver student safety feasible without considering other issues. For example, somebody can pretend to be a child's parent and take away all the necessary login information from the real parent and then monitor the detail of the child which can allow the possibility of crime. Future researches can also consider network failure during the process of login into the system website for monitoring.

Chen (2014) conducted a feasibility study in a paper entitled *"Intelligent Classroom Attendance Checking System Based on RFID and GSM"*, in order to improve the conventional

method of recording and managing attendance of students via roll call which can waste a lot of time and resources. The study carried out an experiment by embedding RFID chip on the student card and RFID reader at the entrance door of the classroom that can enable automatic attendance checking when entering the classroom. The collected facts and data of students will be transmitted to the appropriate person in charge of the attendance issue via Global System for Mobile Communications (GSM) system in the form of text message. Findings of the experimentation indicated a feasible, achievable and good result. However, the authors suggested empirical works in evaluating and quantifying actual similarities and differences between RFID and GSM in terms of attendance checking system. In addition, the issue of impersonation is another thing to future studies can consider, because an impersonator can get a student card, pretend to be his/her card and easily check-in the attendance since it is automatically based on a student card fixed with RFID chip.

Arulogun et al. (2013) established an increase in the number of applications based on RFID systems in different fields. RFID technology facilitates automatic wireless identification by using passive and active electronic tags with suitable readers. In this study, an attempt was made to solve the problem of listening and monitoring that recurred in developing countries that use RFID technology. The application of RFID developed and deployed in student attendance monitoring can eliminate the time wasted by manually collecting attendance and providing education managers with opportunities to obtain face-to-face classroom statistics to assign appropriate attendance scores. This coincides with the content of Daniel et al. (2019) who developed a prototype system made of pressure (force sensitive resistor) and radio frequency identification (RFID) sensors for library seats and a web application for real-time seat usage status. This study argued that with the increasingly complex and complicated changes in the environment, RFID utilization is becoming more robust, hence there is need to advance further research on the field.

Feasibility Study of RFID Data Technology Utilization In Construction Management

The paper of Lin (2015) entitled "*Feasibility Study of UAV Use for RFID Material Tracking on Construction Sites*". They conducted a preliminary test and analysis on the feasibility of combining Unmanned Aerial Vehicles (UAV) technologies with RFID technologies in order to improve tasks such as inspection, documentation of construction, work progress, and safety visualization in the construction sites. Results from the test study indicated that an RFID reader equipped with UAV can identify and provide location of tagged materials. Although, results from this paper showed an attainable and excellent results with regards to the location of tagged construction materials, but the paper failed to consider some technical restrictions that includes RFID reader weight and detection range between RFID reader and tags. This can considerably affect the identification and location of tagged materials and hence, necessitate further research. However, with the enhancement of the Internet of Things (IoT) network and its widespread use in various industries, people may worry that the construction industry may lag behind other industries. In addition, the feasibility of the Internet of Things in the construction industry will be used for rapid and high-quality development of buildings (Maru et al., 2020).

Abosuliman (2018) in his paper entitled *"RFID Technology in the oil Industry"*. The feasibility Study focused on assessing the feasibility of using RFID in Saudi Aramco's Drilling and Operations (D&WO) used in the tracking and use of drill bits in remote wells. This research continues to identify specific examples of errors, including delivery errors and improper use of

bit types, long delays in retrieving tools from deep wells, and using the correct bit for positioning and re-drilling. Research believes that the complexity of drilling operations requires planning, ordering, and delivery of high-quality materials and equipment to avoid component failures in drilling operations. Therefore, the study concluded that, if it proves feasible, the use of RFID tags can identify the drill bit and eliminate the factor of human error from the use of the drill bit. However, this article only focuses on one industry i.e the petroleum industry, neglecting other industries that adopted the RFID technology. Therefore, this limits its conclusions. Consistent with the research of Reddy & Kone, (2019) and Shah & Mishra (2016) they all claimed that digital transformation is an ongoing challenge in the construction industry, and the best solution is the Internet of Things system. Similarly Parra et al. (2019) proposed the combination of different systems using digital technologies and systems with IOT. These suggest further researches which include multiple industries.

Zeng et al. (2015) in their paper *"Assessing the feasibility of passive and BAP RFID communication in construction site scenarios",* they believe that effective building operation management, such as tracking the identification of engineering components, and using these components in cluster projects Source and battery-assisted passive (BAP) radio frequency identification tags (RFID tags), field conditions and on-site processes will be greatly improved. The research conducted a feasibility study by modifying and analyzing the EPC RFID monitoring system to utilize and monitor the performance and characteristics of RFID communication in a cluster heating plant, and then monitor this communication with the same technology in an ideal laboratory. Research results and analysis showed that, due to the multipath effect in metal crowded scenes, tags can actually perform better in this case. However, findings of this paper relied only on the feasibility of tags' performance in metal-crowed scenarios due to its multipath effects without considering other scenarios like plastic, concrete and wood-crowed on whether tags can actually perform better or not in particular kinds.

Kim et al. (2013) in their paper titled *"Development of Automatic Pipeline Monitoring System for Factory Construction Projects Using RFID and 3D Models".* They studied the use of RFID and 3D models for automated pipe monitoring of factory construction projects and System development. They evaluated the feasibility of RFID and 3D adoption for real-time pipeline tracking system used in factory construction. Results revealed that the utilization of RFID can improve pipe spool checking system and distribution of spool information in actual point in time for programmed information gathering as well as efficient management of construction activity. Findings also disclosed that 3D model and RFID tag system can smooth the progress of efficiency of the project lifecycle supervision by involving required information. This includes "material, shape, material strength, pressure, etc." during operation and maintenance period. However, one question that arises from the finding is.

How does RFID and 3D model utilization affect the efficiency of a project lifecycle supervision during operations when the project lifecycle supervision changes over time? These therefore demand for further research

Feasibility Study of RFID Data Technology Utilization in Waste Management

Nolz et al. (2011) conducted a study on "*Optimization of infectious medical waste collection using RFID".* The paper seeks to address problems of some characteristics of *"inventory routine and stochasticity".* The study believed that, RFID can be prepared in boxes for an automatic registration as they entered into a pharmacy container. This enables the

collector to control the stock of pharmacies since the precise figure of boxes can be way in at any time. The study further found that acquiring information and gathering of waste material will be conducted during the entire planning phase. This will inform the pharmacists on the adjustment of their time schedule as well as better expectation of their everyday activities. The study concluded the two different proposed solution as an approach can be applied to handle the inventory routine and stochasticity problems. These are: 1) problem structure that joins features of *"inventory routing and stochasticity",* 2) community goals for the dispersing of transmittable medical waste. This paper identified two different proposed solutions as an approach to address the problem of *"inventory routine and stochasticity"* without relating it to the utilization of RFID which as a result limit the findings of the paper. In previous study, Maru et al. (2020) proposed an advanced Decision Support System (DSS) for effective waste collection in Smart Cities using IoT devices like RFID, Sensors, Wi-Fi modules and some more.

Gnoni et al. (2013) in their paper entitled *"A Feasibility Study of a RFID Traceability System in Municipal Solid Waste Management".* They carried out a simulation analysis to assess several organizational scenarios for their performance in terms of estimated service time, number of users served and operating costs. In addition, two different solutions based on RFID for conveying separate household collection services have been evaluated. The study concluded that the RFID-based solutions could guarantee an absolute traceability to waste treatment process. Further research should widen the scope of this study to include many management activities in regards to the municipal solid waste management by linking the service time and number of users served with monitoring and evaluation.

Ruan & Hu (2011) conducted a study on the application of an RFID-based system for construction waste transport: a case in shanghai. The paper presents an exertion towards the feasibility of utilizing RFID technology to reengineer the construction waste transport in Shanghai. The paper considers RFID technology as an automatic identification method, which is used to store information through tags or transponders, and restore the information to a way of exchanging data through electromagnetic coupling through the reader. Thus, the paper carried out an experiment by fixing an RFID tag on the wind shield glass of a truck through a computer interfere function, and reader install in the construction sites and the uploading areas. The result indicated an improvement with regards to the system performance in traffic safety and environmental protection concerning the citizens of Shonghai. However, future studies should broaden the scope of this paper by linking system performance of traffic safety among citizens of other countries.

Feasibility Study of RFID Data Technology Utilization in Transport and Aviation Management

A research work of Grau (2012) is on "*Automatically Tracking Engineered Components through Shipping and Receiving Processes with Passive Identification Technologies".* The focus of this research is to analyze the feasibility of passive identification technology to automatically track structural steel engineering components during transportation. The study believes that understanding the production and delivery status of engineering components is essential for planning and executing construction operations. To this end, the study conducted empirical tests using metal mounting and battery-assisted passive (BAP) and only passive tags under special conditions. Experimental results show that under appropriate conditions, passive RFID

technology can be used to automatically track engineering components. However, future experimental studies should investigate whether passive RFID technology can be used to automatically track engineering components under inappropriate conditions.

Hu et al. (2011) Wrote on *"Application of RFID Technology at the Entrance Gate of Container Terminals".* The paper focuses on examining the feasibility of applying RFID data technology at the entrance gate of container terminals to improve the operation processes as well as its import and export business obstacles. Findings of the paper reveal that, utilization of RFID in the container passage and work area can reduce delay in transitory time of the containers motor vehicles as well as the improvement of the business income of the container trucks. This therefore, drop off the coming up of the trucks and minimize the parking space of the means of transportation. This paper concentrated more on tackling export operation than the import operations. Also, it is arguable to say that even the improvement of the business income of the container trucks is to some extent profitable to export business operation due to more focus on export than the import operation. The result of this paper is corresponds with the research result of Dana et al. (2022a), who investigate the impact of international markets and new digital technologies on business innovation in emerging markets and, who investigate the impact of urban entrepreneurship on sustainable businesses in smart cities by considering the role of digital technologies. In regards to the need of business profitability with digital technologies in today's business environment, further research need to be conducted on digital technologies that can necessitate both the import and export business profitability (Wong & Wong, 2016).

A feasibility study was conducted by Dana et al. (2022b) entitled *"RFID Control System for Passengers Unloading and Unloading on Ferry".* The study focused on investigating RFID-based control system for passengers unloading and unloading on ferry. The author proposed a model for RFID control system in order to bring in a feasible idea of RFID technology that allows for access control with known technical constraints. The author went further to look at the automatic process of ticket check-in via a tag and RFID reader which can enhances the moving of passengers and vehicles from place to place, minimize port overcrowding, remove the feasibility of incorrect boarding to destination, and importantly decrease the amount of currency payments. The author concluded that appropriate utilization of RFID technology can computerizes port procedures in addition to improve business management by dipping the amount of work assigned to a person or group in a specific period as well as eliminating the possibility of human error. However, the conclusion of this paper left some questions unanswered. For instance, how can the control system for embarkation/disembarkation of passengers and vehicle on/from ferries works when RFID data utilization time changes?

Wong &Wong (2016) presented a paper on *"The Development of Reusable Luggage Tags in Mobile Tracking and Environmental Sustainability of the Internet of Things".* They studied the feasibility of developing reusable baggage tags through the Internet of Things for mobile tracking and environmental sustainability, so that the airline baggage tracking process can proceed smoothly. The author introduced the structure and composition of RFID technology, as well as the database management system and mobile applications on smart phone devices, aimed at simplifying reusable tags so that luggage can be tracked and tracked anytime and anywhere. The results of the study indicated that a feasible test was successfully conducted,

indicating that the information flow started with RFID-identified data obtained through the point of sale (POS) system. The data is passed to the database management system which displays in the mobile application of the smartphone. Based on the findings of this paper, further experimental research need to be conducted to test run the development of reusable luggage tag in the aviation baggage tracking procedure as well as other non-aviation sector.

METHODOLOGY

This study is based on previous literature search in three different databases that contain related publications on the feasibility study of RFID data technology utilization. In the search strategy process, four main sub-topics emerged from the Preferred Report Elements for Systematic Reviews and Meta-Analysis (PRISMA). This research includes exclusion and inclusion, data abstraction and evaluation. PRISMA was selected for literature review search because the database has passed the quality control process and is a comprehensive source of data research. We reviewed literature within a specific time frame in order to determine the previous feasibility studies of RFID data technology utilization. This study utilized three databases during the review process: Scopus, Google scholars and Science Direct, where the databases include over 100,000 fields of study. We acquired 98 journals from Scopus, 112 from Google scholars, while Science Direct indexed a total of 102 with the title feasibility study on RFID data technology utilization over the past ten years. Using key words of the present study, followed by a process of finding those with similar meanings and terminology.

Therefore, 312 articles were successfully retrieved from these three databases, and the screening process was conducted based on the defined exclusion and inclusion criteria. In the first stage, 223 articles were excluded, and in the second stage, 51 articles were excluded, and the selected articles were written only in English. In addition, a 10-year period from 2010 to 2020 (to maintain reliability and the dynamic changes that have occurred over time) was preferred for the program and included students' management area, construction management area, waste management area and aviation management to improve the prospect of receiving relevant articles. In addition, 32 articles were reviewed according to the specified standards, and as a result, 18 articles were omitted because they were not feasibility studies. Due to omissions, a total of 21 articles were analyzed, but due to duplication and inclusion criteria, 16 articles were finally selected for final review. The search was initiated by combining the title, abstract and keywords of the article as needed.

In final stage data abstraction and evaluation were employed where themes and sub-themes are developed from the selected articles. During the theme development process, 21 selected articles were thoroughly examined to elicit statements and create meaningful coding themes to the nature of data. The review process is summarized in Figure 1 listed below.

The search from the databased is formed from; Feasibility of RFID data technology utilization; (LIMIT-TO PUBSTAGE *"final")* and (LIMIT-TO (PUBYEAR 2010-2020) and LIMIT-TO SUBJAREA *"Student Management"* OR *"Construction Management"* OR *"Waste Management"* OR *"Transport and Aviation Management"* and (LIMIT-TO EXACKEYWORD

"Feasibility" and *"RFID Data Technology" and "Utilization"*) and (LIMIT-TO LANGAUGE "English").
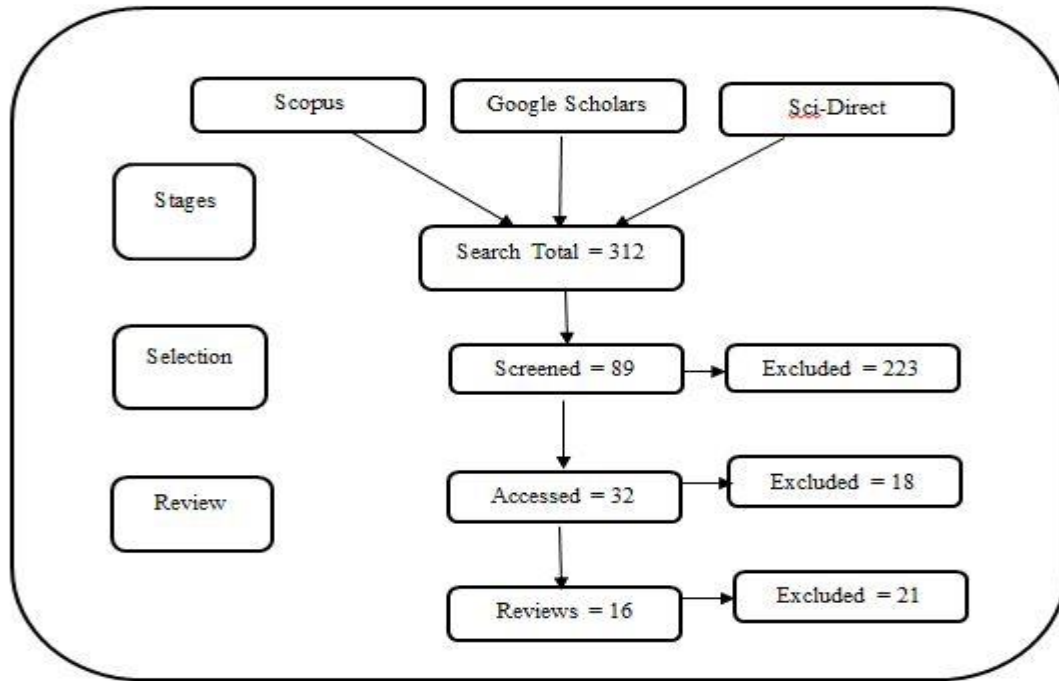

FIGURE 1
PRISMA FLOW DIAGRAM OF THE REVIEW PROCESS

RESULT AND DISCUSSION ON FINDINGS

The result showed that 21 articles meet the criteria of this study. A total of sixteen (16) papers were critically reviewed in which five (5) were from students' management area, four (4) from construction management area, three (3) from waste management area and four (4) from transport and aviation management area. Based on the thematic analyses, other sub-themes emerged from these key reviews to match RFID data Utilization (Internet of Things). However, findings from critical literature review reveals that research gaps existed in all the papers that discuss the feasibility study of RFID data technology utilization.

The findings from the critical review of related works showed that RFID data is the technology utilized in various areas that include students' management, construction management, waste management and transport and aviation management. However, in all of these papers research gaps exist. For instance, findings of the study carried out by on secure attendance management using RFID technology showed no significant evidence on how to tackle the problem of impersonation that may occur during the process of collecting classroom lecture attendance.

A research gap observed in the critical review paper of is that the paper pointed out why the utilization of RFID-based detection might deliver student safety from kidnapping feasible without considering other issues like impersonation and the network failure during the process of

login into the system website for monitoring. Because, an important function of a network in the monitoring process is to interconnect various devices or points so that data can be transferred from one location to another instantly. And in a situation where the network fails, then the issue of login into the system website for monitoring will not be feasible since the monitoring process depends on the network. Also, risk of an impersonator might be present at the stage of login into system website. Even though, some systems have a lot of security protocols but even with that impersonation mostly happens due to improper protection of users' login in details.

Moreover, findings of the critical review paper of Chen (2014) indicates that fixing RFID chip on the student card and RFID reader at the entrance door of the classroom can make an automatic attendance checking feasible. It also facilitates the collection of facts and data of the students who are not present in the classroom via Global System for Mobile Communications (GSM) system in the form of text message. However, the author identified two areas which an empirical work needs to be done in order to evaluate and quantify actual similarities and differences between RFID and GSM in terms of attendance checking system. Also the issue of impersonation is another thing to be considered because an impersonator can get a student card and pretend to be his/her card and can easily check-in the attendance since it is automatic based on a student card fixed with RFID chip. It is recommended to fix a Close Circuit Television (CCTV) to work in conjunction with the GSM and RFID so that as the RFID checking the attendance and GSM gathering the data then CCTV can capture the real image of students that have been checked and thereby minimize the feasibility of impersonation while conducting the classroom attendance. These findings were supported by Dana et al. (2022b) and on the feasibility study from the IOT conceptualization (Miskovic et al., 2016).

CONCLUSION

In this paper, a critical review on the feasibility study of RFID data Technology Utilization from various areas have been examined in order to identify, explain and recommend further studies pointed out from the critical review. It is clear that the utilization of RFID data technology in the management of students, waste, constructions as well as transport and aviation is feasible as it can facilitate and automate the tasks. The study pointed out that, successful utilization of this technology requires an understanding of the general process and method of management. Even though, research gaps existed in all the various published papers discussed, the feasibility study of RFID data utilization particularly as another sub-theme (Internet of things) emerge from the review, thus this paper provided a roadmap for further studies. However, the findings of this paper could be translated in the light of limitation as the study is limited to only four areas which are generally public sectors. Therefore, the result of this paper may not apply to other areas that are private sectors. Hence, findings of this paper have limited generalizability.

AKNOWLEDGEMENTS

continued support and useful suggestions. Their supervision aided me in entirely the period of writing this paper. I offer my honest appreciation for the learning openings provided by them to me. However, this paper received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

Abosuliman, S.S. (2018). RFID Technology in the Oil Industry" "feasibility study". *Journal of Research in Humanities and Social Science, 6*, 12-16.

Arulogun, O.T., Olatunbosun, A., Fakolujo, O.A., & Olaniyi, O.M. (2013). RFID-based students attendance management system.

Chen, H. (2014). Intelligent classroom attendance checking system based on RFID and GSM. In *Advanced Materials Research*, 989, 5532-5535.

Dana, L.P., Salamzadeh, A., Mortazavi, S., & Hadizadeh, M. (2022a). Investigating the impact of international markets and new digital technologies on business innovation in emerging markets. *Sustainability*, *14*(2), 983.

Dana, L.P., Salamzadeh, A., Hadizadeh, M., Heydari, G., & Shamsoddin, S. (2022b). Urban entrepreneurship and sustainable businesses in smart cities: exploring the role of digital technologies. *Sustainable Technology and Entrepreneurship*, 100016.

Daniel, O.C., Ramsurrun, V., & Seeam, A.K. (2019). Smart library seat, occupant and occupancy information system, using pressure and RFID sensors. In *2019 Conference on Next Generation Computing Applications (NextComp)*, 1-5.

Gnoni, M.G., Lettera, G., & Rollo, A. (2013). A feasibility study of a RFID traceability system in municipal solid waste management. *International Journal of Information Technology and Management*, *12*(1-2), 27-38.

Grau, D., Zeng, L., & Xiao, Y. (2012). Automatically tracking engineered components through shipping and receiving processes with passive identification technologies. *Automation in Construction*, *28*, 36-44.

Hu, L., Shi, X., Voß, S., & Zhang, W. (2011). Application of RFID technology at the entrance gate of container terminals. In *International Conference on Computational Logistics*. 209-220.

Khairul Azizan, S., & Nazatul Shima, A.R. (2013). Radio frequency identification for efficient library management. *International Journal of Business and Social Science*, *4*(15).

Kim, C.H., Kwon, S.W., & Cho, C.Y. (2013). Development of automated pipe spool monitoring system using RFID and 3D model for plant construction project. *KSCE Journal of Civil Engineering*, *17*(5), 865-876.

Landt, J. (2005). The history of RFID. *IEEE potentials*, *24*(4), 8-11.

Lin, S. (2015). Feasibility study of uav use for RFID material tracking on construction sites. *51st ASC Annual International Conference Proceedings*.

Maru, R., Pitroda, D. J., & Raval, A. (2020). Feasibility study of Internet of Things (IoT) in construction industry.

Medvedev, A., Fedchenkov, P., Zaslavsky, A., Anagnostopoulos, T., & Khoruzhnikov, S. (2015). Waste management as an IoT-enabled service in smart cities. In *Internet of Things, Smart Spaces, and Next Generation Networks and Systems*,104-115.

Miskovic, T., Ristov, P., & Markic, Z. (2016). RFID control system for the embarkation/disembarkation of passengers and vehicles on/from ferries. *Transactions on Maritime Science*, *5*(02), 161-171.

Nolz, P.C., Absi, N., & Feillet, D. (2011). Optimization of infectious medical waste collection using RFID. In *International Conference on Computational Logistics*, 86-100.

Ouakasse, F. & Rakrak, S. (2017). Towards a approach using RFID in high schools and universities. International *Journal for Research in Applied Science and Engineering Technology, 5*.

Parra, L., Rocher, J., Sendra, S., & Lloret, J. (2019). An energy-efficient IoT group-based architecture for smart cities. *In Energy Conservation for IoT Devices*, 111-127.

Peris-Lopez, P., Hernandez-Castro, J.C., Estevez-Tapiador, J.M., & Ribagorda, A. (2016). Attacking RFID systems. *Information Security Management Handbook*, 313-334.

Preradovic, S., & Karmakar, N. C. (2010). Chipless RFID: Bar code of the future. *IEEE microwave magazine*, *11*(7), 87-97.

Reddy, G.H., & Kone, V. (2019). Study on implementing smart construction with various applications using internet of things techniques. *International Journal of Recent Technology and Engineering (IJRTE), 7*, 188-192.

Ruan, T., & Hu, H. (2011). Application of an RFID-based system for construction waste transport: a case in Shanghai. In *International Conference on Computational Logistics*, 114-126.

Shah, J., & Mishra, B. (2016). Customized IoT enabled wireless sensing and monitoring platform for smart buildings. *Procedia Technology*, *23*, 256-263.

Vimal C., et al. (2015). Secure attendance management system using rfid technology. *International Research Journal of Engineering and Technology*, 2.

Wong, E.Y., & Wong, W.H. (2016). The development of reusable luggage tag with the internet of things for mobile tracking and environmental sustainability. *Sustainability*, *9*(1), 58.

Zeng, L., Grau, D., & Xiao, Y. (2015). Assessing the feasibility of passive and BAP RFID communications on construction site scenarios. *IEEE Systems Journal*, *10*(4), 1505-1515.