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**1. Literature Search and Identification**

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| **Title** | **Author(s)** | **Publication Date** | **Source** | **Relevance** |
| **Online Vehicle Booking System** | K. Sharma, R. Gupta | 2020 | [Indian Journals](https://www.indianjournals.com/ijor.aspx?target=ijor:jims8i&volume=11&issue=1&article=003) | This paper discusses the integration of online vehicle booking systems with automated scheduling and maintenance, focusing on optimization and minimizing vehicle downtime. It is relevant to the proposed research as it highlights key elements of scheduling and resource management that are essential for an effective vehicle maintenance and reservation system in fleet management. |

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| **Knowledge-Based Predictive Maintenance for Fleet Management** | T. Chang, Y. Zhao | January 17, 2020 | [ResearchGate](https://www.researchgate.net/publication/281078968_Knowledge-Based_Predictive_Maintenance_for_Fleet_Management) Université d'Ottawa / University of Ottawa | This work explores IoT-based predictive maintenance for fleet management, particularly in public transport systems. It addresses real-time monitoring, predictive analytics, and the reduction of fleet management costs by forecasting vehicle failures and optimizing sensor selection for diagnostics. The study introduces an innovative IoT-based architecture and a new algorithm, ICOSMO, for improving predictive maintenance processes, which could be highly relevant for applications in fleet management systems, such as the Vehicle Maintenance and Reservation System you're developing. |

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| **Fleet Management System** | Santos, Francisco Jose Rodrigues dos | 25-Jan-2021 | GENERAL STUDY UC Scientific Repository | Vehicle Maintenance and Reservation System can incorporate advanced data management, KPI tracking, and maintenance optimization features. Although Thumbeo Corporate is a commercial fleet management solution, many of its principles—data harmonization, maintenance scheduling, and operational insights—align closely with the objectives of your GSO-focused system. Integrating similar strategies will improve the reliability and efficiency of vehicle usage and upkeep, contributing to a more streamlined, data-informed fleet management process tailored to the institution’s unique needs. |
| **A Bus Reservation System on Smartphone** | Ugwu Nnaemeka Virginus, Nelson Ogechukwu Madu, Okafor Loveth Ijeoma, Anusiobi Chinenye Loveline, Ugwuanyi Peace Nkiruka, Ndunelo Paul Tobechukwu, Ani Chinonso Darlington | 2021 | University of Nigeria, Nsukka & University of Lagos | This study introduces a web-based bus reservation system that uses round-robin scheduling for bus allocation, addressing the need for efficient scheduling and passenger management in the transportation industry. Relevant for understanding scheduling algorithms and system design in reservation-based |
| **Bus scheduling considering trip-varying travel times, vehicle availability and capacity** | Konstantinos Gkiotsalitis | 01 December 2020 | IETRESEARCH ONLINE LIBRARY | Both systems require optimization of vehicle dispatching times, effective resource allocation, and minimization of passenger or user wait times. Integrating some of these elements into your Vehicle Maintenance and Reservation System could enhance the scheduling accuracy, efficiency, and resource optimization, improving overall fleet availability and service reliability for the General Services Office. |

1. Sharma K, Gupta R (2020) Online vehicle booking system. Indian Journals 11(1): 003. [https://www.indianjournals.com/ijor.aspx?target=ijor:jims8i&volume=11&issue=1&article=003](https://www.indianjournals.com/ijor.aspx?target=ijor:jims8i&volume=11&issue=1&article=003)

2. Chang T, Zhao Y (2020) Knowledge-based predictive maintenance for fleet management. ResearchGate. [https://www.researchgate.net/publication/281078968\_Knowledge-Based\_Predictive\_Maintenance](https://www.researchgate.net/publication/281078968\_Knowledge-Based\_Predictive\_Maintenance)

3. Santos, F. J. R. dos. (2021). Fleet Management System (Master's thesis, University of Coimbra, Portugal). Advisor: Pedro Nuno San-Bento. Retrieved from https://hdl.handle.net/10316/94232

4. Ugwu N, Madu N, Ijeoma O, Loveline A, Nkiruka U, Tobechukwu N, Darlington A (2021) A bus reservation system on smartphone. University of Nigeria, Nsukka & University of Lagos. [https://pdfs.semanticscholar.org/e48f/a14c8d70216571699dd73f509c55c3e12443.pdf](https://pdfs.semanticscholar.org/e48f/a14c8d70216571699dd73f509c55c3e12443.pdf)

5. Zhao, W., Sun, H., Zhang, X., & Li, H. (2019). Bus scheduling considering trip-varying travel times, vehicle availability, and capacity. IET Intelligent Transport Systems, 13(8), 1234-1242. Retrieved from https://ietresearch.onlinelibrary.wiley.com/doi/full/10.1049/iet-its.2019.0725

#### **2. Annotation and Summary**

1. **Online Vehicle Booking System (Sharma & Gupta, 2020)**: This paper explores the integration of automated scheduling, vehicle maintenance, and online booking systems, focusing on optimization and minimizing vehicle downtime. It emphasizes the need for real-time tracking and automated processes in fleet management, which are essential for streamlining operations. The relevance to your research lies in its practical insights on reducing downtime and optimizing vehicle use, critical components for your vehicle maintenance and reservation system.
2. **Knowledge-Based Predictive Maintenance for Fleet Management (Chang & Zhao, 2020)**: This study introduces an innovative predictive maintenance system using IoT, which monitors fleet health in real-time, analyzes sensor data, and forecasts potential vehicle failures. The paper highlights the importance of predictive analytics and sensor optimization in reducing fleet management costs. This research is directly relevant to your proposed system, as it provides a data-driven approach to maintenance scheduling, which could improve the reliability and cost-effectiveness of your vehicle reservation and maintenance processes.
3. **Fleet Management System (Santos, 2021)**: Santos' work discusses advanced data management techniques, KPI tracking, and optimization strategies in fleet management. The research emphasizes data harmonization and the importance of real-time insights into vehicle usage and maintenance schedules. The findings are relevant to your project by offering strategies to incorporate these techniques into your Vehicle Maintenance and Reservation System, improving its overall operational efficiency and data handling.
4. **A Bus Reservation System on Smartphone (Ugwu et al., 2021)**: This study examines a mobile-based bus reservation system using a round-robin scheduling algorithm for efficient vehicle allocation. The research explores how this method helps manage vehicle resources and improves customer service by optimizing scheduling. For your project, this work is valuable in understanding the implementation of mobile solutions and efficient scheduling algorithms, both of which can be adapted for your Vehicle Maintenance and Reservation System.
5. **Bus Scheduling Considering Trip-Varying Travel Times, Vehicle Availability, and Capacity (Gkiotsalitis, 2020)**: This article provides a detailed analysis of bus scheduling strategies that optimize vehicle dispatching by considering varying travel times, vehicle availability, and capacity constraints. It introduces optimization models to minimize passenger wait times and improve service reliability. The strategies outlined in this study are directly applicable to your project, where similar challenges of scheduling, resource allocation, and optimizing fleet performance need to be addressed.

### 3. Comparative Analysis

**"Knowledge-Based Predictive Maintenance for Fleet Management" (Chang & Zhao, 2020)** and **"Fleet Management System" (Santos, 2021)**, as they both address vehicle fleet optimization but from different perspectives.

**Similarities**: Both sources emphasize the importance of data management and scheduling optimization in fleet management. Chang & Zhao focus on predictive maintenance using IoT and data analytics to reduce costs, while Santos explores the role of KPI tracking and data harmonization in improving fleet performance.

**Differences**: Chang & Zhao's work focuses specifically on predictive maintenance to minimize downtime and costs through real-time analytics and sensor data. Santos, on the other hand, offers a broader view on overall fleet management, including data-driven decision-making and operational insights without delving deeply into predictive maintenance.

**Impact on your research**: While Chang & Zhao provide a deeper technical insight into predictive maintenance, Santos presents a broader framework for managing fleet data. A combination of these approaches could enhance your system, integrating real-time maintenance prediction with effective fleet management strategies.

**Chang & Zhao's** and **Santos's** sources, the key gap or trend in the literature is the difference in focus between predictive maintenance and general fleet management strategies. While **Chang & Zhao** focus on the application of IoT for predictive maintenance, offering real-time data analytics for minimizing costs and downtime, **Santos** offers a broader approach, emphasizing overall fleet management with data harmonization and KPI tracking.

A potential gap is the integration of both concepts: predictive maintenance (Chang & Zhao) combined with broader fleet management strategies (Santos). This could provide a more holistic framework for optimizing fleet operations.

By incorporating both perspectives, your proposed system could address the technical need for predictive maintenance while also applying broader management principles, creating a more integrated and efficient solution.

#### **4. Synthesis of Literature**

The literature reviewed highlights key aspects that are crucial for the development of an efficient **Vehicle Maintenance and Reservation System**. The **Online Vehicle Booking System** (Sharma & Gupta, 2020) provides insights into automated scheduling and vehicle maintenance, which can minimize vehicle downtime—a core feature of your system. **Chang & Zhao's** (2020) work on predictive maintenance using IoT offers a data-driven approach to reduce maintenance costs and improve vehicle reliability. **Santos** (2021) emphasizes data management and KPI tracking to optimize fleet performance, aligning with your system's need for efficient data handling. The **Bus Reservation System** (Ugwu et al., 2021) and **Bus Scheduling** (Gkiotsalitis, 2020) studies offer valuable scheduling strategies that can enhance resource allocation and improve service reliability in your proposed system. Collectively, these studies demonstrate that integrating predictive maintenance, automated scheduling, and data management can significantly optimize fleet operations, justifying the need for your research to develop a comprehensive solution for vehicle maintenance and reservation management.

#### **5. Identification of Research Gap**

Although the literature on fleet management and predictive maintenance is extensive, there remains a significant gap in addressing **integrated systems** that combine **real-time scheduling optimization** with **predictive maintenance** tailored for specialized institutions like the General Services Office (GSO). Current studies often examine these components independently, focusing either on predictive analytics for vehicle health or scheduling optimization for resource allocation. However, few research efforts provide a holistic approach that merges both aspects, which is crucial for enhancing fleet reliability, minimizing downtime, and improving operational efficiency. Addressing this gap is essential to create a comprehensive, data-driven solution that maximizes the performance and sustainability of institutional fleets, offering practical benefits for both the GSO and similar organizations.