Hyper-automation of Business Processes in the Commercial Premises Equipment Technical Service Sector

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ABSTRACT

Industrial digitization, as an integral part of the Industry 4.0 revolution, encourages organizations to implement advanced technologies that enable process automation, improve data management, and increase operational efficiency. However, in companies operating within the commercial facility maintenance sector, many processes are still carried out fragmentedly, relying heavily on manual labor and insufficiently integrated systems, which underscores the relevance of analyzing the potential application of hyperautomation. Despite the growing accessibility of digital technologies, maintenance companies still face process fragmentation, high demands for manual labor, and significant administrative costs. Furthermore, there is a lack of a clear understanding regarding which operational processes can derive the greatest value from hyperautomation technologies and how to effectively integrate them into the general business management system. The aim of the research was to propose process automation solutions for commercial facility maintenance companies in order to achieve full hyperautomation of their operations. The main objectives of the study were to analyze the theoretical aspects of process hyperautomation and the application of advanced digital technologies in maintenance companies based on scientific literature; to investigate the current processes of companies in the commercial facility maintenance sector using expert evaluation and to determine their hyperautomation potential along with the most suitable technological tools; and to design an updated, hyperautomation-based operational process model and provide implementation guidelines. To achieve the research objective, methods such as scientific literature analysis, multi-criteria evaluation, expert assessment, in-depth interviews, and process analysis were applied. The results of the expert evaluation revealed that the highest potential for hyperautomation was identified in the areas of fault registration, work scheduling, technical diagnostics, spare parts management, and administrative processes. The hyperautomation model developed on the basis of this research demonstrated that the greatest operational benefits are achieved by integrating business management systems, artificial intelligence, robotic process automation, and Internet of Things (IoT) technologies into a unified process management environment.

Keywords: business processes, process analysis, hyper-automation, commercial premises equipment technical service sector.

1 Introduction

Industrial digitization, an integral part of the Industry 4.0 revolution, encompasses not only individual technologies but also the comprehensive integration of digital systems into all business functions. In the field of maintenance, digitization streamlines workflows, automates routine tasks, and facilitates real-time monitoring of equipment condition. These innovations reduce unplanned downtime, lower operational costs, and increase safety (Nagy et al., 2026). Despite these advancements, challenges remain. Many companies within the commercial facility maintenance sector still rely on outdated and inefficient practices in their processes, which require a high volume of manual labor. This creates a significant administrative burden for maintenance technicians, engineers, and administrative personnel.

Process automation in commercial facility maintenance companies faces challenges such as process fragmentation, an overall low level of technological readiness, and resistance to change (Baarimah et al., 2025). Ahmed et al. (2023) note that maintenance remains one of the most challenging industrial areas to digitize. For instance, up to 45% of equipment maintenance specialists' working time can be consumed by administrative tasks. Despite the increasing availability of digital technologies, there is still limited understanding of how different hyperautomation technologies should be integrated across maintenance processes in order to maximize operational efficiency and reduce administrative workload.

The object of this research was the operational processes of companies in the commercial facility maintenance companies. The aim of the research was to propose process automation solutions for commercial facility maintenance companies in order to achieve full hyperautomation of their operations. The main objectives of the study were to analyze the theoretical aspects of process hyperautomation and the application of advanced digital technologies in maintenance companies based on scientific literature; to investigate the current processes of companies in the commercial facility maintenance sector using expert evaluation, and determine their hyperautomation potential along with the most suitable technological tools; and to design an updated, hyperautomation-based operational process model and provide implementation guidelines. To achieve the research objective, methods such as scientific literature analysis, multi-criteria evaluation, expert assessment, in-depth interviews, and process analysis were applied.

2 Literature Review

In the modern business environment, the digitization of maintenance operations is becoming one of the most critical factors for organizational efficiency. Digitization enables the early detection and prediction of equipment issues, allowing for strategic planning of maintenance activities rather than reactively responding to unexpected failures. The transition to proactive maintenance not only reduces production downtime on the client side but also improves resource allocation and extends the lifespan of critical assets (Nagy et al., 2026). This shift is enabled by continuous, real-time data collection and analysis capabilities provided by the Internet of Things (IoT) and artificial intelligence (AI) (Introna et al., 2024). Scientific literature emphasizes that the implementation of individual digital tools or isolated process automation does not create a comprehensive organizational transformation. Baarimah et al. (2025) argue that the isolated application of technology often addresses only local problems, meaning organizations achieve only limited growth in efficiency. Only the integrated application of different technologies allows for the creation of a seamless operational management system and the realization of the full potential of digital transformation.

For the aforementioned reasons, the concept of hyperautomation is gaining increasing significance. Hyperautomation is defined as the integrated application of artificial intelligence (AI), robotic process automation (RPA), and Internet of Things (IoT) systems, designed to coordinate and automate an organization's entire operational chain (Baarimah et al., 2025; Arno & Gabryelczyk, 2025). Unlike traditional automation, hyperautomation focuses not on the automation of individual tasks, but on the seamless coordination of operational processes and the real-time movement of information across organizational departments.

According to Sarferaz (2025), the foundation of process management lies in Enterprise Resource Planning (ERP) systems, which digitize and integrate processes across all organizational departments. These systems cover a wide range of functions, including sales, marketing, finance, supply chain management, manufacturing, services, procurement, and human resource management, acting as a centralized repository for organizational data and processes. The scale and complexity of ERP systems provide a platform for integrating technologies: AI optimizes maintenance processes and reduces the number of inefficient activities (Baarimah et al., 2025); IoT collects data from devices in real time and applies preventive maintenance (Abdulmajeed et al., 2024; Rakholia et al., 2025); and RPA automates repetitive administrative tasks by mimicking human actions within system user interfaces (Dumas et al., 2023).

When examining the trends in implementing the digitization of maintenance processes and the efforts to adapt to this transition, Ahmed et al. (2023) and Introna et al. (2024) draw upon the research of M. Kans regarding the transformation toward maintenance 4.0 and service management 4.0 in their articles. M. Kans (2022) examines the digitization of maintenance service management (customer orders, work planning and execution, inventory management) as value creation for the customer. Table 1 structurally presents the information collected during the analysis regarding the possibilities of applying technologies in maintenance processes.

Table 1: Processes and Proposed Tools for Automation (compiled by the authors)

Process	Technology	Application of Technology	Advantages	Disadvantages
Order registration and fault diagnostics	ERP, IoT, AI	ERP systems integrate organizational processes into a single centralized platform and enable real-time information management across different organizational departments (Sarferaz et al., 2025). IoT technologies allow real-time data collection from devices and the application of predictive maintenance (Abdulmajeed et al., 2024). Artificial intelligence provides the ability to resolve potential problems before they cause disruptions to operations, processes, or	Centralized order registration and status tracking; Faster information transfer between administration and technicians; Better real-time management of customer requests; Faster fault identification (Sarferaz et al., 2025; Navarro et al., 2026; Aboshosha et al., 2023).	Complex system implementation and process restructuring requiring high investments (Sarferaz et al., 2025). Cybersecurity threats; Heavy reliance on communication infrastructure (Souza et al., 2024); IoT devices continuously generate massive amounts of data, the storage, filtering, and interpretation of which require significant computational and financial resources (Kumar et al., 2024).

		systems (Gawde et al., 2023).		
Work scheduling and engineer assignment	ERP, AI	Artificial intelligence allows for the optimization of maintenance processes and reduces the amount of inefficient activities (Baarimah et al., 2025). The ERP system digitally transforms daily scheduling and routine administrative work processes (Wang et al., 2024).	More efficient work allocation; Forecast of specialist workloads; Route optimization (Baarimah et al., 2025); Helps reduce scheduling and operational execution costs (Wang et al., 2024).	Difficult model adaptation in a dynamic environment; High dependence on data accuracy (Aliaga, 2024); Excessive customization of the system for scheduling needs complicates its maintenance, while poor documentation leads to errors (Bradford et al., 2024).
On-site work execution	ERP, RPA, AI	RPA automates task allocation, notification sending, and data transfer activities between systems (Perdana et al., 2023). AI provides the ability to more accurately forecast demand and improve resource allocation (Fei et al., 2025); ERP systems store data related to business processes and enable systematic handling and management of maintenance documents	Access to accumulated technical knowledge; Assistance for less experienced specialists (Kliestik et al., 2023); Lower demand for manual labor (Dumas et al., 2023); Contractual information in the ERP system allows logistical and administrative steps to be consistently integrated and linked with ongoing maintenance	Difficult to interpret AI decisions (Fei, 2025); Limited flexibility in non-standard situations (Dumas et al., 2023); Few ready-to-use factory packages or modules are available on the market (Tan et al., 2022).

		required for work execution (Gill et al., 2024).	work (Gill et al., 2024).	
Warehouse and spare parts management	ERP, AI	ERP optimizes processes and ensures high-quality supply of materials (Necas et al., 2024). Artificial intelligence analyzes historical data and forecasts spare parts demand, facilitating the planning of inventory levels and orders (Baarimah et al., 2025).	Automated inventory control; Faster material requirement planning; Better supply coordination (Navarro et al., 2026).	Continuous data updating is required (Sarferaz et al., 2025); AI systems can inherit latent bias from historical data or create new systemic errors due to the specific nature of their algorithms (Thelwall, 2025).
Accounting and analytics	ERP, RPA, AI	RPA technology automates repetitive administrative tasks by mimicking human actions within system user interfaces (Dumas et al., 2023). AI can identify patterns and detect anomalies in financial transactions or analytical reports (Sarferaz et al., 2025). The ERP system is used to process data exported from production orders and cost/expense	Automatic invoice generation; Faster document processing; Reduced administrative workload (Dumas et al, 2023); Data transfer and integration with ERP/MES layers is very fast. Real-time company-wide monitoring and maintenance process planning are ensured (Davlatov et al., 2026).	Employee resistance to automation (Fei et al., 2025). High employee qualifications and complex initial architectural solutions are required (Davlatov et al., 2026).

		centers (Davlatov et al., 2026).		

The conducted analysis also showed that each technology addresses different operational problems: ERP acts as the foundation for process integration, IoT ensures real-time data collection, AI enables forecasting and data-driven decision-making, and RPA automates repetitive administrative operations. Considering the identified technology application opportunities and limiting factors, the results of the scientific literature analysis were used to prepare the expert research questionnaire and determine the criteria for multi-criteria evaluation.

3 Research Methodology

In order to evaluate the possibilities of automating maintenance processes, an expert study was conducted using qualitative interview and multi-criteria evaluation methods.

The study was carried out in two stages. In the first stage, an analysis of scientific literature was conducted, during which maintenance processes and their automation possibilities using artificial intelligence (AI), robotic process automation (RPA), Internet of Things (IoT), and enterprise resource planning (ERP) systems were examined. The literature analysis allowed for the identification of key technological solutions, their advantages, disadvantages, and application possibilities in maintenance processes.

In the second stage, an expert study was conducted using a structured in-depth interview methodology. This method was chosen to comprehensively analyze the current organization of maintenance processes, identify main operational bottlenecks, and evaluate the potential of different digital technologies within the processes. The experts were selected using purposive sampling. The study involved 16 specialists working in the field of maintenance, with at least 10 years of work experience. When selecting the experts, their competence, involvement in the organization of maintenance processes, and practical experience in making decisions related to fault management, work planning, spare parts management, or operational administration were assessed

Data were collected using a structured questionnaire developed on the basis of the theoretical analysis. The questionnaire covered six thematic areas: order registration and fault diagnostics, work scheduling and specialist allocation, on-site work execution, warehouse and spare parts management, accounting and analytics, and organizational digitization strategy. To assess the suitability of different technologies for process automation, experts evaluated ERP, RPA, AI, and IoT technologies using a three-point scale, where 1 indicated insignificant impact, 2 indicated significant impact, and 3 indicated high significance for process automation.

The collected responses were analyzed using qualitative content analysis and multi-criteria evaluation methods. The interview data were grouped according to process stages in order to identify recurring operational problems, causes of inefficiency, and potential technological solutions. Technology evaluation scores were aggregated to determine average values and process significance weights. Process weights were established based on expert assessments of the relative importance of each process for achieving maintenance process hyperautomation.

The main interview questions used in the study are presented below.

3.1 Order registration and fault diagnostics:

- How is the process of receiving and registering emergency and planned orders organized?
- How are orders currently prioritized and categorized?

- How is initial fault diagnostics currently performed at the time of the order?
- How is the order list managed (statuses and other information)?
- The application of which technologies (ERP, AI, RPA, IoT) would be significant for order registration, classification, diagnostics, and order management processes, helping to automate: receiving and registering orders through different channels; automatically assigning priorities and categories to orders; defining faults more accurately; order list management; other?

3.2 Work scheduling and specialist allocation:

- How is work scheduling and task allocation to specialists organized?
- How is the distribution of work among specialists controlled?
- How is information about assigned tasks communicated to specialists?
- How does preparation for troubleshooting take place before arriving at the facility?
- The application of which technologies (ERP, AI, RPA, IoT) would be significant for work scheduling and specialist allocation processes, helping to automate: automatically generating tasks; scheduling work more efficiently; sending information to technicians; forecasting problems; other?

3.3 On-site work execution:

- How is the work execution process organized on-site?
- Which parts of the process incur the highest time consumption?
- How much time is taken up by filling out documents, searching for information, and transferring data to the administration?
- How often do specialists lack information about the equipment or the nature of the faults?
- The application of which technologies (ERP, AI, RPA, IoT) would be most significant for work execution processes, helping to automate: filling out and transferring reports to the administration; searching for information about the fault and equipment; mobile work environment; other?

3.4 Warehouse and spare parts management:

- How is the supply of materials and spare parts to specialists organized?
- How are critical inventory levels controlled?
- How are unforeseen material orders handled?
- How do specialists determine the availability of required parts and their source of acquisition?
- The application of which technologies (ERP, AI, RPA, IoT) would be most significant for warehouse and spare parts management processes, helping to automate: maintaining warehouse inventory levels; ordering for unforeseen needs; mobile work environment; selecting the source of materials; other?

3.5 Accounting and analytics:

- How is the processing of completed work data organized?
- How long does it take to prepare invoices for clients?
- How are operational and analytical reports prepared?
- How is working time tracking conducted?
- The application of which technologies (ERP, AI, RPA, IoT) would be most significant for accounting and analytics processes, helping to automate: processing data from completed work reports; preparing analytical reports; filling out working time tracking sheets; other?

4 Organization's digitization strategy

- Are current processes more focused on problem prevention or reaction after a problem occurs?
- How do you evaluate the current level of digitization in the organization?
- With the implementation of which technologies should the company start to achieve the fastest financial return?
- What are the biggest risks or "worst-case scenarios" that arise when digitizing processes?
- What is the likelihood that managers would support the implementation of digital solutions?
- How would employees accept the implementation of digital solutions for specific processes (ERP, AI, RPA, IoT)? Why?
- In your opinion, what will maintenance operations management look like in 5–10 years using the discussed technologies (ERP, AI, RPA, IoT)?

5 Results and Discussion

Following the analysis of scientific literature, the main processes carried out by companies in the commercial facility maintenance companies and the technologies used for their automation were identified. The expert evaluation helped define the current situation of maintenance processes. The results of the current situation assessment are presented in Table 2, Table 3, Table 4, Table 5, Table 6.

Table 2: Assessment of the current situation of operational processes in commercial facility maintenance companies: order registration and fault diagnostics (compiled by the authors)

Process	Sub-process	Current situation assessment
Order registration and fault diagnostics	Order receipt via digital channels	15 out of 16 experts (94%) identify phone calls as the main order channel for emergency cases. 10 out of 16 experts (63%) identify email as the main channel for planned orders. 4 out of 16 experts (25%) indicated that inquiries are also received through the company's website.
	Order prioritization and categorization	7 out of 16 experts (44%) make the decision regarding the importance of the inquiry individually during a call or reading. 4 out of 16 experts (25%) determine priorities based on classifiers (client type, fault, operational impact). 3 out of 16 experts (19%) use special software, or the priority is specified in the system by the client themselves. 2 out of 16 experts (12%) do not

		prioritize; jobs are processed according to the order of registration.
	Order list management (statuses)	7 out of 16 experts (44%) do not track the order list in real time. 6 out of 16 experts (38%) delegate the centralized monitoring of the order list to an administrator. 3 out of 16 experts (18%) use a dedicated fault management program.
	Remote diagnostics for accurate fault definition	11 out of 16 experts (68%) do not perform remote diagnostics and only record initial client information. 3 out of 16 experts (18%) identify initial visual defects based on photos attached by clients. 2 out of 16 experts (12%) assess the fault based on a questionnaire or the equipment's history in the system.

The results of the expert evaluation presented in Table 2 show that the order registration and fault diagnostics processes in most companies still rely on traditional communication channels and individual employee experience. Prioritization, order status management, and initial diagnostics are mostly performed manually, which means process efficiency depends on the competence and subjective decisions of specific employees. The limited application of remote diagnostics and the lack of real-time information indicate a significant potential for the automation and integration of this process.

Table 3: Assessment of the current situation of operational processes in commercial facility maintenance companies: work scheduling and engineer assignment (compiled by the authors)

Process	**Sub-process**	**Current situation assessment**
Work scheduling and engineer assignment	Assignment of orders to the appropriate specialists	13 out of 16 experts (81%) state that jobs are manually assigned by a manager (based on location, materials, experience). 3 out of 16 experts (19%) use software that automatically assigns tasks based on availability.
	Transmission of orders to specialists via digital channels	9 out of 16 experts (56%) transfer information to specialists via email, SMS, or phone call. 4 out of 16 experts

		(25%) present tasks in the office during morning meetings or via an urgent phone call. 3 out of 16 experts (18%) generate tasks in the system directly into the employee's personal task queue.
	Even distribution of orders	9 out of 16 experts (56%) rely on the honesty of the technicians and the manager's intuition (monitoring via phone). 4 out of 16 experts (25%) monitor the overall distribution of work in the system and adjust it manually. 3 out of 16 experts (18%) use a system that automatically redistributes work based on the daily workload.

The results of the expert evaluation presented in Table 3 reveal that the work scheduling and specialist allocation processes are dominated by manual coordination and managerial decisions. Task allocation, workload balancing, and the transmission of information to specialists are mostly carried out using traditional means of communication, meaning process efficiency depends on the human factor. This indicates a need to apply integrated operational management systems capable of automating task allocation and optimizing the utilization of available resources.

Table 4: Assessment of the current situation of operational processes in commercial facility maintenance companies: on-site work execution (compiled by the authors)

Process	Sub-process	Current situation assessment
On-site work execution	Signing of the completed work report and transmission to accounting	13 out of 16 experts (81%) fill out reports by hand (5–20 min) and look for a signature (30–60 min). 3 out of 16 experts (19%) do not waste time on auxiliary processes due to sufficient digitization.
	Searching for information about the fault and equipment	12 out of 16 experts (75%) encounter a lack of information or discrepancies 1–10 times a week. 4 out of 16 experts (25%) encounter a lack of information very rarely; the process operates stably.

	Receiving orders on the move	6 out of 16 experts (38%) use only company mobile phones while on the move. 5 out of 16 experts (31%) use smartphones and laptops for diagnostics. 5 out of 16 experts (31%) use specialized tablets, GPS tracking, and diagnostic software.

The results of the expert evaluation presented in Table 4 show that the greatest challenges of on-site work execution are related to administrative activities and information availability. The majority of specialists still fill out documents manually, and a lack of information about equipment or faults occurs regularly. Although some companies use mobile solutions and specialized equipment, the overall level of process digitization remains uneven, meaning there are significant opportunities to increase operational efficiency through the application of mobile and integrated digital systems.

Table 5: Assessment of the current situation of operational processes in commercial facility maintenance companies: Warehouse and spare parts management (compiled by the authors)

Process	Sub-process	Current situation assessment
Warehouse and spare parts management	Maintaining the required quantity of critical materials in the warehouse	7 out of 16 (44%) experts mentioned that the balance of required materials is maintained by the relevant departments or individuals. 9 out of 16 (56%) experts state that they take care of purchasing the required materials themselves each time.
	Ordering materials from the supplier	7 out of 16 (44%) experts mentioned that the company's logistics specialists handle the purchase of materials. 6 out of 16 (38%) experts mentioned that they buy the required materials themselves at points of sale. 3 out of 16 (18%) experts emphasized that the supplier delivers the goods directly to the site as needed.
	Informing specialists about material balances	6 out of 16 (38%) experts mentioned that they have the ability to monitor material balances in the company's

		warehouse. 10 out of 16 (62%) experts admitted that they either do not monitor the material balance or look for information directly from suppliers.

The expert evaluation results presented in Table 5 reveal that many companies lack a centralized inventory management mechanism, and searching for and ordering required materials is often left to the specialists themselves. The lack of information about stock levels and limited options for real-time inventory tracking increase operational uncertainty and can lead to additional time costs. The study results suggest that integrated warehouse management could significantly improve the responsiveness of maintenance processes.

Table 6: Assessment of the current situation of operational processes in commercial facility maintenance companies: Accounting and analytics (compiled by the authors)

Process	Sub-process	Current situation assessment
Accounting and analytics	Entering completed work reports into the system	8 out of 16 experts (50%) use a fully manual paper-based data entry process. 5 out of 16 experts (31%) perform decentralized manual data entry, where specialists or administrators enter information at the end of the working day or after completing maintenance tasks. 3 out of 16 experts (19%) use digital document submission, where information is uploaded electronically and relevant data are automatically extracted and recorded in the system.
	Invoicing clients based on completed work reports	13 out of 16 experts (81%) issue invoices only upon receiving factual information about individual reports. 3 out of 16 experts (19%) provide data to the system, therefore issuing invoices quickly.
	Preparation of analytical reports	13 out of 16 experts (81%) spend 2–3 hours of manual work on report preparation. 3 out of 16 experts (19%) generate the main reports

		automatically through a software program.
	Management of working time tracking sheets (timesheets)	8 out of 16 experts (50%) dedicate up to 3 hours of manual work to enter the timesheet of one team. 5 out of 16 experts (31%) spend 10–30 minutes on filling it out (about 1 hour per month). 3 out of 16 experts (19%) track time directly in the system, linking it to the technicians' work.

The expert evaluation results presented in Table 6 reveal that accounting and analytics processes are still dominated by manual data processing and document administration. Entering completed work reports, invoicing, preparing analytical reports, and tracking working time in most cases require a significant amount of employee time. This situation shows that administrative processes remain one of the main factors limiting operational efficiency, and their automation could generate the greatest organizational benefit.

The analysis of scientific literature showed that in order to achieve complete hyperautomation of operations in commercial facility maintenance companies, an enterprise resource planning (ERP) system must be used as the core technology, while integrating artificial intelligence (AI), robotic process automation (RPA), and Internet of Things (IoT) technologies. A summarized expert evaluation of the possibilities for applying these technologies to process automation, obtained using the multi-criteria evaluation method, is presented in Table 7. When evaluating the technologies, the experts emphasized that their operations are currently focused on problem-solving rather than prevention. For this reason, IoT technology, which is intended for remote diagnostics, was not mentioned among the technologies with which the experts would begin the digitization processes. IoT and AI were indicated more as future technologies. ERP and RPA technologies received the highest evaluations due to their ability to integrate and automate existing operational processes.

Table 7: Results of the evaluation of technologies for process automation (compiled by the authors based on expert evaluations)

Process	**Weight**	**ERP**	**RPA**	**AI**	**IoT**
Order registration and fault diagnostics	0,2	2,28	1,74	1,88	1,68
Work scheduling and engineer assignment	0,3	2,36	1,97	1,76	1,27
On-site work execution	0,2	2,26	1,75	1,56	1,6
Warehouse and spare parts management	0,2	2,42	2,07	1,48	1,13
Accounting and analytics	0,1	2,78	2,24	1,57	1,42

Based on the theoretical framework and the expert evaluations of the current situation (Figure 1), a model of operational processes based on hyperautomation is proposed (Figure 2), which illustrates the processes to be automated with the help of the selected technologies.

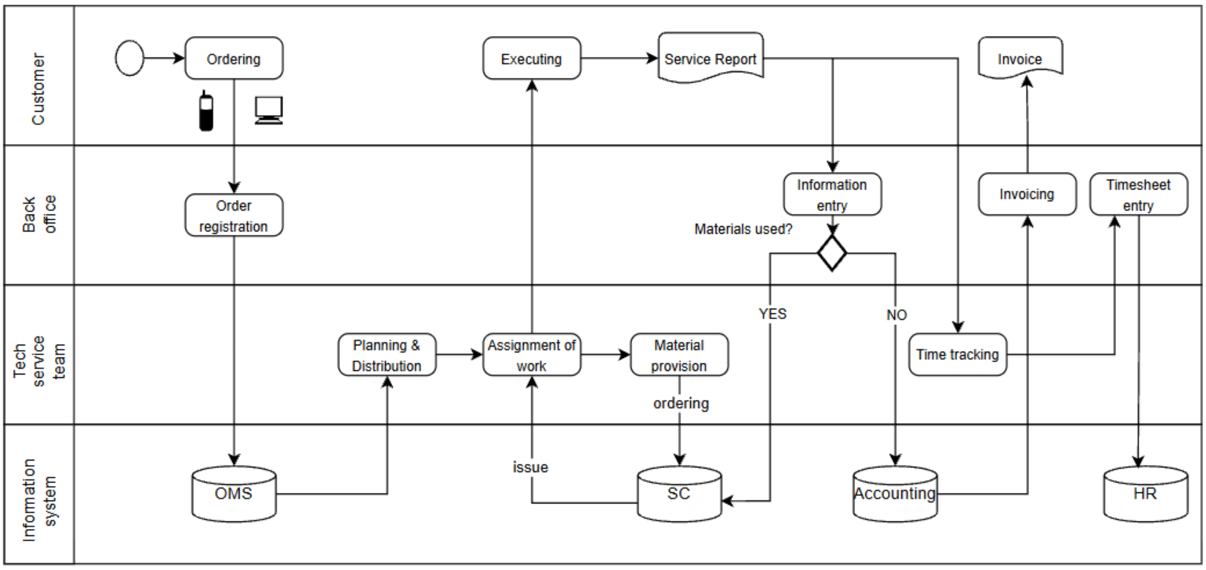

Figure 1: Automation of maintenance processes: current situation (compiled by the authors)

ERP replaces individual systems used for specific processes, which results in a reduction of manual data entry, as the functional modules within the ERP system use standardized data and exchange it automatically. The transfer of data from paper documents signed by the client (service report) is eliminated by applying RPA solutions. AI solutions assist in the processes of work allocation, material stock maintenance, report generation, and analytics. The application of IoT technology depends on how many of the serviced devices can currently be connected to the WLAN.

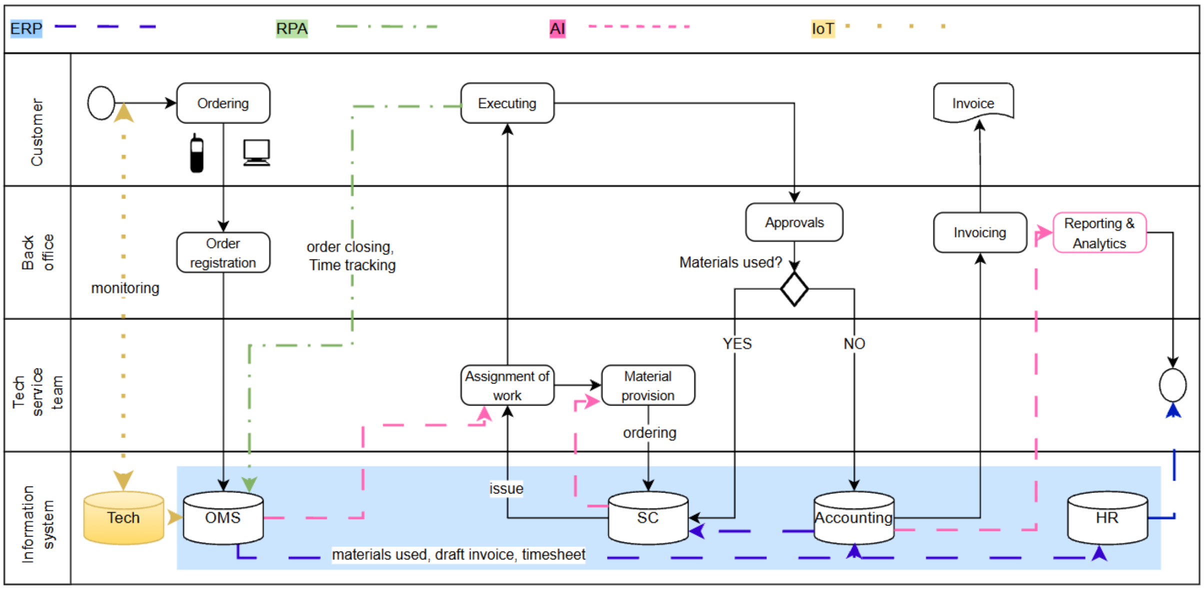

Figure 2: Opportunities for the automation of maintenance processes (compiled by the authors)

The application of the described technologies successfully addresses the hyperautomation of companies in the commercial facility maintenance companies, but the level of their application depends on the resources available to the companies themselves. For large enterprises, ERP systems can cover a substantial share of automation needs, reducing the necessity for extensive RPA implementation. For medium and small enterprises, an all-in-one ERP solution can be too expensive, so RPA technology, which offers a very wide choice of tools, would come to the rescue here. Sarferaz (2025) examines the possibilities of implementing

AI agents offered by AI platforms into their systems, which would also significantly reduce implementation costs. IoT is still a future technology for this sector, but possible solutions include applying IoT to key commercial facility equipment, upon whose condition the continuous operations of the client depend.

6 Conclusions

The analysis of scientific literature showed that the hyperautomation of processes in companies within the commercial facility maintenance companies goes beyond the limits of traditional digitization by integrating an enterprise resource planning (ERP) system with advanced technologies—artificial intelligence (AI), robotic process automation (RPA), and the Internet of Things (IoT). The literature review indicated that significant efficiency gains can be achieved by transforming reactive “break-fix” maintenance into proactive and data-driven maintenance practices. Hyperautomation enables organizations not only to optimize resources but also to improve service availability and operational continuity.

The conducted expert evaluation of companies in the commercial facility maintenance companies revealed that the greatest potential for hyperautomation lies in the processes of order management, work allocation and execution, material stock maintenance, report generation, and analytics, which currently require the most manual labor and time. According to the expert evaluation, ERP systems received the highest overall scores, followed by RPA solutions, while AI was primarily perceived as a promising technology for future process optimization.

Based on the results of the theoretical analysis and the empirical study, a maintenance process model based on hyperautomation was designed, which reduces manual work by integrating operations into a seamless digital ecosystem. To ensure the successful realization of the model, a smooth integration of new tools with existing systems and clear organizational change management practices is required. It is also important to develop the digital competence of employees. The proposed hyperautomation model can serve as a practical framework for maintenance companies seeking to transition from fragmented and reactive operations toward integrated and data-driven maintenance management.

Future research is recommended to evaluate the practical implementation results of the proposed hyperautomation model, analyzing its impact on operational efficiency, cost reduction, customer service quality, and employee productivity and workload distribution.

References

Nagy, M., Valaskova, K., Lazaroiu, G., (2026). Digitalization-Based Predictive Maintenance Systems, Internet of Things Sensor Networks, and Machine Intelligence Algorithms for Industry 4.0/5.0 Manufacturing Processes https://doi.org/10.3390/systems14030281

Aboshosha, A., Haggag, A., George, N., & Hamad, H. A. (2023). IoT - based data - driven predictive maintenance relying on fuzzy system and artificial neural networks. Scientific Reports, 1–13. https://doi.org/10.1038/s41598-023-38887-z

Ahmed, U., Carpitella, S., & Certa, A. (2023). A Feasible Framework for Maintenance Digitalization. 1–14.

Araya-aliaga, E., Atencio, E., Lozano, F., & Lozano-galant, J. (2025). Automating Dataset Generation for Object Detection in the Construction Industry with AI and Robotic Process Automation (RPA).

Arno, P., & Gabryelczyk, R. (2025). The iBPM Lifecycle : Integrating Low-Code and Hyperautomation Into Business Process Management. IEEE Access, 13(October), 175410–175426. https://doi.org/10.1109/ACCESS.2025.3619274

Kans, M., (2022) The Journey Towards Successful Application of Maintenance 4.0 and Service Management 4.0 https://doi.org/10.1007/978-3-030-96794-9_13

Baarimah, S. O., Mohammad, A., Alyami, H., Baarimah, A. O., Almujibah, H. R., & Ramu, M. B. (2025). Functional analysis of hyperautomation in construction for advancing efficiency and sustainability through process optimization and technological integration. 1–17.

Abdulmajeed Dabwan, A., Kaid, H., Al-Ahmari, A., Alqahtani K., N., Ameen, W.,(2024). An Internet-of-Things-Based Dynamic Scheduling Optimization Method for Unreliable Flexible Manufacturing Systems under.

Fei, Y., Liou, J., & Jui, P. (2025). Evaluating the dual impact of AI and RPA on sustainability and brand equity : A case study of digital transformation in Taiwan ' s service sector. Cleaner Engineering and Technology, 29(October), 101106. https://doi.org/10.1016/j.clet.2025.101106

Gal, A. (2023). AI-augmented Business Process Management Systems : 14(1), 1–19.

Introna, V., & Santolamazza, A. (2024). Strategic maintenance planning in the digital era : a hybrid approach merging Reliability - Centered Maintenance with digitalization opportunities. Operations Management Research, 1397–1420. https://doi.org/10.1007/s12063-024-00496-y

Kliestik, T. (2023). OeconomiA copernicana (Vol. 14, Issue 4). https://doi.org/10.24136/oc.2023.033

Necas, L., Novac, J. (2024). TEAM2024-00022 CREATION , MANAGEMENT , AND USE OF A DATABASE FOR THE MAINTENANCE PROCESS OF PRODUCTION EQUIPMENT IN AN INDUSTRIAL COMPANY. 1269, 7584–7591. https://doi.org/10.17973/MMSJ.2024

Navarro M., B., Ybanez, C., J., Hurtado, G., A., F., (2026). Enterprise Resources for the Digital Transformation of Small and Process Automation in accounting firms Benefits, Medium Firms : 13(1), 1–24. https://doi.org/10.4018/IJBAN.409313

Sarferaz, S. (2025). Implementing Agentic AI Into ERP Software. IEEE Access, 13(October), 178945–178960. https://doi.org/10.1109/ACCESS.2025.3621887

Souza, P., Ferreto, T., & Calheiros, R. (2024). Maintenance Operations on Cloud , Edge , and IoT Environments : Taxonomy , Survey , and Research Challenges. 56(10).

Perdana, A, W. Eric Lee , Chu Mui Kim (2023) Prototyping and implementing Robotic Process Automation in accounting firms: Benefits, challenges and opportunities to audit automation https://doi.org/10.1016/j.accinf.2023.100641

Rakholia, R., Suárez-Cetrulo A. L., Singh, M. Carbajo R. S. (2025) Integrating AI and IoT for Predictive Maintenance in Industry 4.0 Manufacturing Environments: A Practical Approach https://doi.org/10.3390/info16090737

Wang, D., Kakar, A., S., Khan, M., K., Ali, M., I., 5 , Hoo, W., C., Liau C., H., Khan, M., A., (2024) Digitalization of Present Work Process; Investigating the Role of Leadership, Change Management and Top Management Support in the Success of Enterprise Resource Planning Projects https://doi.org/10.3390/su162411178

Bradford, M., Bucy R., A., Adivar, M., (2024) Implementing ERP with Maintenance and Support in Mind: Exploring the Efficacy of Application Management Services for the Post-Implementation Phase https://doi.org/10.2308/ISYS-2022-064

Gill, M. S., & Fay, A. (2024). Utilisation of semantic technologies for the realisation of data-driven process improvements in the maintenance, repair and overhaul of aircraft components. CEAS Aeronautical Journal, 15, 459–480. https://doi.org/10.1007/s13272-023-00696-5

Davlatov, S., Zayniyev, A., Zokirov, J., Temirova, M., Uljaevae, S., Khudayberganov, K., Matkarimov, I., & Van Truong, C. (2026). Integration of digital twin technology and Industry 4.0 principles for real-time structural health monitoring in smart manufacturing facilities. *International Journal of Industrial Engineering and Management*, *17*(1), 1–20. https://doi.org/10.24867/IJIEM-400

Thelwall, M. (2025). Research quality evaluation by AI in the era of large language models: advantages, disadvantages, and systemic effects - An opinion paper. *Scientometrics*, *130*, 5309–5321. https://doi.org/10.1007/s11192-025-05361-8

Kumar, V., Sharma, K. V., Kedam, N., Patel, A., Kate, T. R., & Rathnayake, U. (2024). A comprehensive review on smart and sustainable agriculture using IoT technologies. *Smart Agricultural Technology*, *8*, Article 100487. https://doi.org/10.1016/j.atech.2024.100487

Tan, M., Liao, C., Liang, L., Yi, X., Zhou, Z., & Wei, G. (2022). Recent advances in recombinase polymerase amplification: Principle, advantages, disadvantages and applications. *Frontiers in Cellular and Infection Microbiology*, *12*, Article 1019071. https://doi.org/10.3389/fcimb.2022.1019071