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Systematic Review of AppSheet-Based Attendance Systems: Outcomes, Features, and Sectoral Adoption

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ABSTRACT

This study presents the first systematic review of AppSheet-based no-code attendance systems, synthesizing outcomes, features, and sectoral adoption from 23 eligible studies published between 2020 and 2025. A PRISMA-guided systematic literature review was conducted using Google Scholar, and the included studies were assessed for quality using the CASP checklist and synthesized using a narrative descriptive approach. Results indicate that AppSheet enhances efficiency, accuracy, transparency, and user satisfaction compared to manual methods. Two dominant features, GPS with selfie verification and QR code validation, were identified, along with variations such as digital signatures and WhatsApp-linked QR codes, which underscores the platform's adaptability. Adoption is concentrated in the education sector, with limited but emerging applications in government and industry. From a practical perspective, AppSheet provides a flexible and low-cost solution for digitalizing attendance in resource-constrained environments. From a theoretical perspective, this review contributes to the no-code application development literature by demonstrating how non-technical users can design functional systems tailored to organizational needs. Limitations include reliance on Google Scholar and potential language bias. Future research should broaden database coverage and explore integration with biometric authentication, blockchain-based security, or ERP systems to enhance scalability and data security.

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1. INTRODUCTION

The past two decades have witnessed a profound digital transformation that has reshaped the way individuals interact, perform daily activities, and manage various aspects of organizational life. This transformation is driven by rapid advancements in information and communication technologies, which are increasingly inclusive and far-reaching. Digitalization is no longer perceived as an optional initiative but has become a strategic necessity that determines the sustainability, competitiveness, and operational effectiveness of modern organizations [1], [2], [3], [4]. As reliance on technology intensifies, nearly all administrative, managerial, and operational processes have shifted from manual to digital systems.

One organizational function that has undergone significant digitalization is attendance management. Attendance serves not only as a basic indicator of individual discipline but also as a foundation for performance evaluation and payroll management [5], [6]. Accurate attendance data are essential for productivity reporting and strategic organizational planning. Consequently, efficiency, accuracy, and transparency in attendance tracking have become critical issues that must be addressed through digital technologies

Despite the widespread adoption of digitalization, many organizations continue to rely on manual attendance systems. According to Alagasan, et. al [7] conventional methods, such as paper-based attendance sheets, may appear simple but present significant limitations . They are difficult to verify, susceptible to manipulation [8], time-consuming to process [9], and lack integration with other administrative systems [10]. These shortcomings become increasingly complex in organizations with large workforces or geographically dispersed members, where inaccuracies in attendance records may undermine managerial effectiveness, delay decision-making, and increase the risk of information misuse.

Another limitation of manual systems is their inability to provide real-time data integration [11], which is essential in modern organizational contexts. The demand for accurate, immediate, and multi-location attendance monitoring highlights the urgency of adopting digital attendance solutions as a vital component of technology-driven governance.

Various digital attendance technologies have been introduced to overcome these challenges. Biometric systems, such as fingerprint and facial recognition, provide high levels of accuracy and resistance to manipulation [12], [13], but they require costly hardware and raise ethical concerns regarding data privacy. Radio Frequency Identification (RFID) offers a fast and practical method of recording attendance through electronic cards [14], yet remains vulnerable to card loss or misuse. Quick Response (QR) codes provide an affordable and widely accessible alternative, leveraging commonly used smart devices, but remain susceptible to manipulation without additional verification mechanism [15], [16]. Cloud-based attendance systems have recently gained traction for their ability to support real-time data recording, cross-platform integration, and multi-location access [17]. Still, their effectiveness is constrained by dependency on reliable internet infrastructure[18]. Each of these approaches offers distinct advantages and limitations, and no single solution can fully accommodate the diverse needs of all organizational contexts. This reality underscores the need for more flexible, adaptive, cost-effective, and scalable attendance solutions.

In this regard, the emergence of no-code or low-code development paradigms has introduced a promising alternative. No-code platforms enable users without technical expertise to design applications tailored to organizational needs without extensive programming knowledge [19], [20]. Such platforms broaden access to digital innovation, reduce development costs, and accelerate implementation. One notable platform in this domain is AppSheet, developed by Google [21] [22] . AppSheet allows the creation of digital attendance applications with seamless integration to data sources such as Google Sheets and Google Drive [23], [24]. Its advantages include ease of use, low implementation cost, high flexibility in feature customization, and accessibility across both mobile and web platforms [25]. Unlike traditional attendance technologies that rely heavily on specialized hardware, AppSheet provides a simpler, more affordable, and rapidly adaptable alternative [26].

However, academic research on the use of AppSheet in digital attendance systems remains limited. The existing literature has predominantly focused on biometric, RFID, fingerprint, and facial recognition solutions, while studies on no-code platforms like AppSheet are still fragmented, descriptive, and lack systematic synthesis. This situation reveals a significant research gap, namely the absence of comprehensive literature reviews examining the implementation of AppSheet as a digital attendance solution. A deeper understanding of its benefits, challenges, and opportunities is crucial to support broader adoption. Moreover, global publication trends indicate a sharp increase in research on digital attendance systems over the past five years, a trend further accelerated by the COVID-19 pandemic, which intensified digital transformation, expanded remote work practices, and heightened the demand for accurate and flexible attendance systems [27].

To the best of our knowledge, this is the first systematic review that focuses exclusively on AppSheet-based no-code attendance systems. Previous studies have largely addressed biometric, RFID, or web-based platforms, but no comprehensive synthesis has been conducted on AppSheet implementations. This review provides three key contributions:

- It consolidates existing evidence on the outcomes of AppSheet-based attendance systems.
- It identifies the dominant features and configurations reported across organizational contexts.
- It maps sectoral adoption patterns, particularly within education, government, and industry.

By addressing these objectives, the study contributes theoretically by extending the literature on no-code application development and practically by offering decision-makers insights into the opportunities and limitations of adopting AppSheet for attendance management.

2. METHODS

2.1. Research Design

This study employed a Systematic Literature Review (SLR) approach, guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol [28]. PRISMA was applied to ensure transparency and replicability across all stages of the review, from identification to inclusion.

To assess the methodological rigor of included studies, the Critical Appraisal Skills Programme (CASP) checklist was applied. Each article was independently evaluated against CASP criteria, focusing on research design, methodological validity, and relevance to the review objectives. The use of CASP ensured that only studies with sufficient quality and clarity were considered in the synthesis, although the descriptive nature of many AppSheet-related studies limited the depth of methodological assessment.

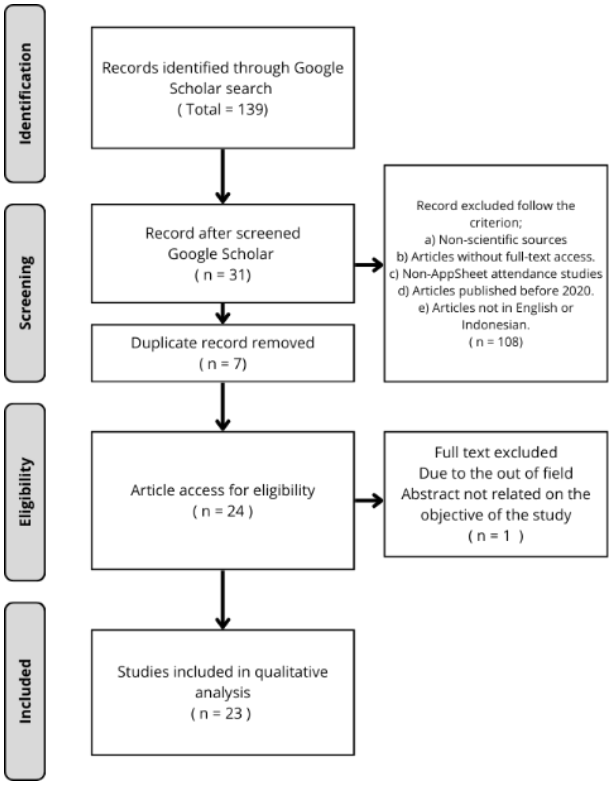

Figure 1. PRISMA Flow Diagram

2.2. Literature Search Strategy

A systematic search of the academic literature was conducted, with Google Scholar as the primary source, accessed both directly and through the Publish or Perish (PoP) version 8 software on 15 June 2025. Google Scholar was chosen because no studies on AppSheet-based attendance systems were identified in major academic databases, including Scopus, Web of Science, IEEE Xplore, and ScienceDirect. Furthermore, its comprehensive coverage enables the retrieval of gray literature, conference proceedings, and emerging studies, which was essential given the limited number of publications specifically addressing AppSheet. To ensure comprehensive retrieval, carefully constructed keyword combinations and Boolean operators were employed. The search strings included: ("AppSheet" AND "digital attendance") OR ("AppSheet" AND "attendance system" AND "no-code") OR (("digital presence" OR "attendance management") AND "cloud-based") OR (("AppSheet" OR "no-code platform") AND ("attendance" OR "presence"))

2.3. Inclusion and Exclusion Criteria

To ensure the relevance and quality of the analyzed literature, specific inclusion and exclusion criteria were established (Table 1). These criteria served as a guide throughout the selection process.

Table 1. Inclusion and Exclusion Criteria

Category	Criteria
Inclusion	a) Articles published in academically recognized journals or conference proceedings. b) Studies discussing the implementation of AppSheet or digital attendance systems. c) Full-text availability. d) Published between 2020–2025. e) Written in English or Indonesian.
Exclusion	a) Non-academic sources (e.g., blogs, popular articles, internal reports). b) Duplicate records from database searches. c) Articles without full-text access. d) Studies on digital technologies unrelated to AppSheet-based attendance systems. e) Articles published before 2020. f) Articles written in languages other than English or Indonesian.

2.4. Article Selection and Analysis

Article selection followed the four PRISMA stages: identification, screening, eligibility, and inclusion, documented qualitatively and visualized in a PRISMA Flow Diagram. Data analysis used a narrative descriptive synthesis, enabling structured comparison of evidence while accommodating variations in study design and context. The synthesis was guided by the following research questions::

- RQ-1: What are the outcomes of implementing AppSheet-based digital attendance systems?
- RQ-2: What features of AppSheet-based digital attendance systems have been implemented?
- RQ-3: Which sectors or organizations have adopted AppSheet-based digital attendance systems?

3. RESULTS AND DISCUSSION

A total of 23 articles were identified through the systematic search and met the established inclusion criteria. The synthesis of these studies provided robust evidence to address the predefined research questions

3.1. RQ1: What are the outcomes of implementing AppSheet-based digital attendance systems?

3.1.1 Efficiency and Process Improvement

The most frequently reported outcome relates to the efficiency of attendance management processes. Multiple studies demonstrated that AppSheet-based systems substantially reduced the time required for attendance recording and recap compared to manual methods [29], [30], [31]. This efficiency extended beyond recording, supporting periodic attendance summaries, streamlined school administration, and simplified data reporting [32], [33].

In the corporate domain, efficiency gains were evident in the monitoring of sales activities and field employee performance, with mobile access enabling flexible use across various locations [34], [35]. Educational institutions also benefited from reduced administrative burden, more orderly learning environments, and improved discipline through timely attendance processes [36], [37]. Collectively, these findings confirm AppSheet as a practical solution for optimizing organizational workflows.

3.1.2 Accuracy and Reliability

Accuracy was another widely cited strength of AppSheet implementations. The integration of QR code technology, GPS, and geolocation features enhanced data reliability by ensuring that attendance was logged at predefined locations [38], [39]. This technological integration minimized errors, supported security in academic environments [40], and helped prevent fraudulent practices such as proxy attendance [41].

Furthermore, several studies highlighted the role of cloud-based access in securing attendance records and enabling their retrieval for audits or decision-making [31], [42]. The use of photographs and dynamic QR codes in some systems provided additional verification layers, thereby strengthening the integrity of the attendance data [37], [43].

3.1.3 Transparency and Monitoring

AppSheet-based attendance systems contributed significantly to organizational transparency and monitoring capacity. Real-time data access enabled institutions to monitor employee and student activities promptly and make timely decisions [44], [45]. This was particularly beneficial in evaluating performance, detecting absenteeism, and providing guidance to students during internships or fieldwork [46].

Enhanced monitoring also facilitated accountability, as management teams gained visibility into attendance compliance, work discipline, and administrative efficiency [47], [48]. Automated reporting further supported performance evaluation by producing structured, accessible, and accurate datasets for decision-makers.

3.1.4 User Experience and Satisfaction

User experience outcomes were predominantly positive. The reviewed studies consistently reported that AppSheet applications were easy to use, intuitive, and adaptive across different platforms (smartphones, computers, and cloud systems). Users appreciated the practicality, simplicity, and accessibility of the systems, which reduced reliance on paper-based processes and promoted environmentally friendly practices [36], [45].

Feedback from educational institutions indicated that teachers, students, and administrators were satisfied with the system's ability to deliver real-time data, generate reports automatically, and integrate seamlessly with existing digital tools such as Google Sheets and WhatsApp [49], [50]. These attributes enhanced not only user satisfaction but also long-term acceptance of the technology.

3.1.5 Limitations and Challenges

Despite the promising outcomes, several limitations and challenges were consistently reported across the reviewed studies, constraining the full potential of AppSheet-based digital attendance systems. First, scalability remains a major concern, as the free version of AppSheet supports only up to ten users, rendering it unsuitable for large-scale organizational use without upgrading to a paid subscription model [44].

Second, QR code–based implementations were prone to proxy attendance, allowing users to log attendance from unauthorized devices. To mitigate this issue, some studies recommended integrating Google Maps for location verification and employing dynamic QR code generation to strengthen system reliability [43], [51]. Third, technical constraints emerged when systems were required to manage larger datasets, with reports of failures due to input limitations in free accounts [34].

The review indicates that AppSheet-based systems markedly improve operational efficiency, data reliability, institutional accountability, and user satisfaction compared with manual methods. Key strengths include faster recording, reliable GPS/QR verification, real-time monitoring, and ease of use, while main challenges involve scalability limits, proxy risks, and internet dependency. Collectively, AppSheet offers a practical and adaptive solution for digital attendance management.

The outcomes of implementing AppSheet-based digital attendance systems find support in broader academic literature. For example, a study on web-based attendance systems in educational settings reported that digital approaches significantly improve administrative efficiency and streamline attendance monitoring processes [52], [53]. Similarly, in government contexts, biometric or fingerprint-based digital systems have been shown to bolster discipline, accuracy, and streamlined personnel management by increasing data transparency and reducing errors [54], [55]. The detailed distribution of these findings across the reviewed articles can be observed in Table 2.

Table 2. Summary of Findings on Outcomes of AppSheet-based Digital Attendance Systems

No	Authors	Year	Findings
1	Gisni [29]	2021	AppSheet-based attendance application facilitates fast, accurate, and efficient attendance recording and recap, accessible via computer or Android phones, making it more practical than manual methods.
2	Kurniawan [44]	2021	Attendance online with AppSheet facilitates recording via computer or smartphone, speeds up attendance recap, and effectively monitors employee location and activity for performance evaluation. However, testing found system failures when used by more than 10 users, as the free AppSheet version only supports up to 10 users.
3	Patresia et al. [51]	2022	Using QR Code with AppSheet on Android devices accelerates attendance and records it accurately. However, the system allows users to "proxy" attendance from different devices, requiring Google Maps location checks and an automatic QR Code update feature each time attendance is taken.
4	Purnomo [38]	2022	The mobile AppSheet-based QR Code attendance system can simplify employee attendance and monitoring. Cloud-based access allows use via smartphone or computer, with attendance location locked to the QR Code coordinate area.
5	Wulandari [42]	2022	The web-based GPS Android attendance application is effective for online attendance processes and supports additional benefits such as COVID-19 prevention within the school.
6	Haq [36]	2023	AppSheet-based attendance provides real-time attendance data, complete reports, and an easy-to-use interface. It supports efficient, practical attendance management, is environmentally friendly, and helps create a more orderly learning environment post-pandemic.
7	Seran et al. [34]	2023	The AppSheet-based online attendance app enables field employees to record attendance quickly and efficiently via smartphone, with GPS ensuring correct location. However, testing found failures due to data input limitations on free accounts.
8	Zulaiha & Usman [30]	2023	The Android-based AppSheet attendance app replaces manual systems, allowing easier smartphone-based attendance. It also facilitates periodic attendance data recap, making record-keeping more efficient and effective.
9	Saepulloh & Rusghana [32]	2023	The AppSheet attendance system simplifies attendance and learning processes, making it more efficient than the manual system.
10	Machfudz et al. [40]	2024	The app improves academic management efficiency with optimal security via geolocation to set coordinates and distance calculations between authorized locations and attendance points.
11	Zulhidayati et al. [37]	2024	The mobile-based online attendance system is proven valid, practical, and effective, facilitating school administration in monitoring and recapping data, speeding up teacher and staff attendance via smartphone, improving discipline, and minimizing fraud thanks to photo and location features.
12	Sahara et al. [47]	2024	The AppSheet-based online attendance system overcomes limitations of manual systems by providing faster, more efficient attendance accessible via electronic devices. It also enhances administrative effectiveness, ease of use, and an intuitive interface, offering a simple and adaptive experience for digital-era users.
13	Mar'atuttahirah et al. [49]	2024	The Android-based e-attendance system with QR code and WhatsApp integration improves efficiency and effectiveness of attendance monitoring, simplifies data access for students, and produces more accurate administrative reports. Testing confirmed

No	Authors	Year	Findings
			that all features functioned as expected, supporting transparent, practical, and efficient attendance processes.
14	Muhammad Rizki & Latif Setiawan [41]	2024	The AppSheet attendance app allows teachers to record attendance faster while simplifying data recap. Accurate GPS location ensures attendance is recorded at the correct position, minimizing potential fraud.
15	Pramesti & Tri Febrianto [39]	2024	The AppSheet-based digital attendance system improves teacher attendance recording efficiency, reduces errors, and accelerates administrative processes. It also enables real-time monitoring and analysis, supporting more effective and transparent management.
16	Niswah & Erfandi [31]	2024	The AppSheet Android attendance app improves efficiency and accuracy in attendance recording, facilitates the attendance process, minimizes manual errors, and provides fast, practical reporting.
17	Fergina et al. [45]	2024	The AppSheet-based attendance app received positive feedback for ease of use and helps schools access real-time attendance reports for monitoring and decision-making.
18	Ushud [48]	2024	The AppSheet attendance app enables more practical attendance processes with real-time data recording, simplifying attendance monitoring and improving administrative efficiency.
19	Sidik et al. [46]	2024	AppSheet helps teachers monitor student attendance during fieldwork, simplifies detection of absences, and serves as a basis for individual or group guidance for students facing challenges during internships.
20	Walad Mahfuzhi et al. [43]	2025	The AppSheet-based attendance app facilitates digital and real-time attendance recording and integrates with reporting systems. However, it has a limitation: users can proxy attendance using different devices.
21	Bajsair & Baisyir [50]	2025	The development of an Android-based student attendance application with AppSheet and Google Sheets has proven effective in improving efficiency, accuracy, and user satisfaction in managing attendance data in the school environment.
22	Aditya & Ushud [35]	2025	AppSheet-based attendance app increases efficiency in the attendance process and daily sales activity reporting, providing a practical solution to support mobility, performance tracking, and overall work effectiveness of company sales staff in the field.
23	Reni Haerani et al. [33]	2025	The Android-based AppSheet attendance system improves efficiency in record-keeping, provides fast and accurate reports, and facilitates data management and communication between the school and parents.

3.2 RQ2: What features of AppSheet-based digital attendance systems have been implemented?

The reviewed literature highlights a diverse set of features integrated into AppSheet-based attendance systems, with two functionalities emerging as the most dominant. The first is selfie photo combined with GPS tracking, which enhances data validity by linking attendance to both self-photo and geospatial coordinates. This dual mechanism minimizes fraudulent practices, strengthens accountability, and ensures greater accuracy. The second is QR code–based verification, which provides a fast, contactless, and user-friendly process for recording attendance through mobile devices. Together, these features underscore the system's emphasis on efficiency and reliability in digital attendance management across educational and organizational contexts.

Beyond these core features, several studies introduced specialized or hybrid implementations to meet diverse institutional needs. Examples include the integration of digital signatures with GPS, multi-layered verification using selfies, signatures, and geolocation, and QR codes linked with messaging gateways for enhanced communication. Simpler variations, such as form-based attendance or GPS-only validation, reflect efforts to balance system complexity with usability. These complementary approaches highlight the

platform's flexibility, demonstrating its ability to support both basic validation processes and advanced, multi-factor authentication mechanisms depending on organizational priorities.

Nevertheless, certain limitations persist, particularly in relation to technical constraints. AppSheet—especially in its free version—relies on Google Sheets as a database and Google Drive for storage, with selfie-based attendance features rapidly consuming available space. Excessive selfie image storage not only risks slowing application performance but is also constrained by the 15 GB free storage limit [56]. Furthermore, simpler mechanisms such as form-based attendance remain vulnerable to proxy submissions [57], leaving gaps in ensuring data validity. These challenges indicate the need for more robust configurations and integration strategies to strengthen reliability and long-term scalability.

Table 3. Implemented Features of AppSheet-Based Digital Attendance Systems

Attendance Feature	Source Articles	Qty
Selfie Photo & GPS location	[29], [44], [30], [40], [37], [47], [41], [39], [48], [46], [43], [50], [35]	13
QR Code	[51], [38], [36], [45], [33]	5
Signature & GPS location	[42]	1
Selfie Photo, Signature & GPS location	[34]	1
Form-attendance	[32]	1
QR Code & WhatsApp Gateway	[49]	1
GPS location	[31]	1

As summarized in Table 3, selfie photo combined with GPS emerged as the most widely adopted feature, followed by QR code verification, while other implementations such as digital signatures, WhatsApp gateway integration, and form-based attendance appeared less frequently. This distribution of features is visualized in Figure 2, which highlights the dominance of selfie-and-GPS mechanisms and QR code verification as the preferred solutions in AppSheet-based attendance systems.

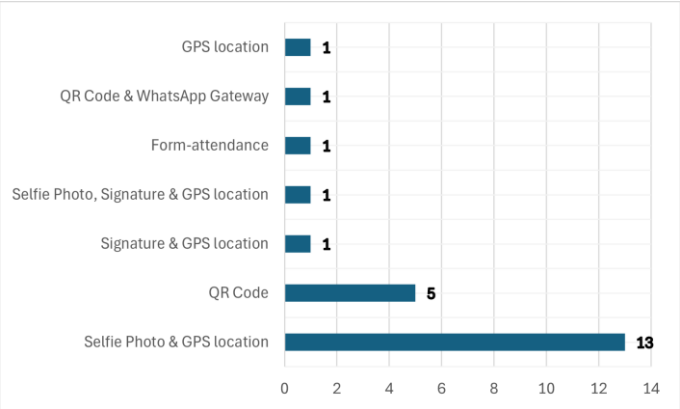

Figure 2. Most frequently reported features in AppSheet Attendance Systems

3.3. RQ3: Which sectors or organizations have adopted AppSheet-based digital attendance systems?

The reviewed literature demonstrates that the adoption of AppSheet-based digital attendance systems is predominantly concentrated in the education sector, which accounts for 20 out of 23 reported implementations. Within this sector, primary and secondary schools constitute the largest subsector, with 15 cases, reflecting substantial interest in leveraging digital attendance tools to improve efficiency, reduce administrative burden, and strengthen discipline among teachers, students, and staff. Higher education institutions represent another notable subsector with four cases, underscoring the applicability of AppSheet in managing large student populations and enhancing academic administration. Reported outcomes in this

context include improved monitoring of employee location and work activities for performance evaluation, the generation of more accurate administrative reports, simplified attendance and monitoring processes for both students and faculty, and support for transparent, practical, and efficient attendance management. Additionally, one study documented the use of AppSheet in a kindergarten setting, indicating that even early childhood education institutions are beginning to explore the potential of mobile-based attendance solutions. These adoption patterns are visually summarized in Figure 3.

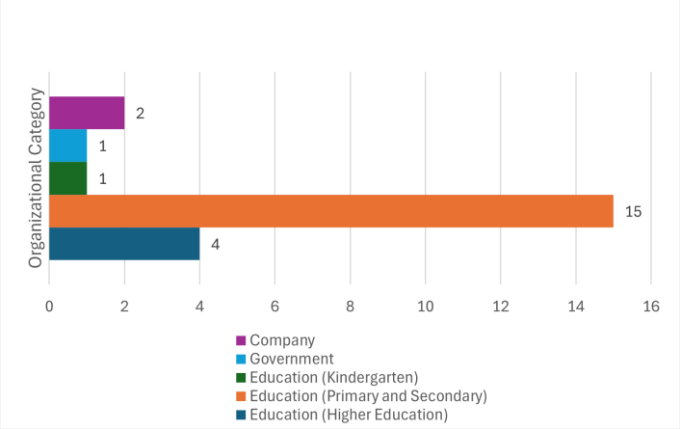

Figure 3. Sectoral Adoption of AppSheet-Based Digital Attendance Systems

Beyond education, other sectors have also adopted AppSheet-based systems, albeit to a lesser extent. The government sector was represented by one case, where the system was utilized to support public service administration and ensure accountability in attendance monitoring. Meanwhile, the company sector accounted for two studies, demonstrating the value of AppSheet for tracking field staff activities, monitoring sales performance, and facilitating mobile workforce management. These findings reveal that while adoption is strongest in education, AppSheet's flexibility enables its application across diverse organizational contexts, from schools to government institutions and private companies.

In terms of publication trends, the adoption of AppSheet attendance systems has increased since the COVID-19 outbreak, which the WHO declared a global health emergency in 2020 [58] [59]. Most implementations were reported after 2020, reflecting the pandemic's role as a catalyst for remote learning and mobile workforce solutions, and accelerating the demand for practical, flexible digital attendance tools. This trend is illustrated in Figure 4, which shows a steady rise in the number of studies from 2021 to 2024, peaking in 2024 with a slight downward trend reported in the first half of 2025.

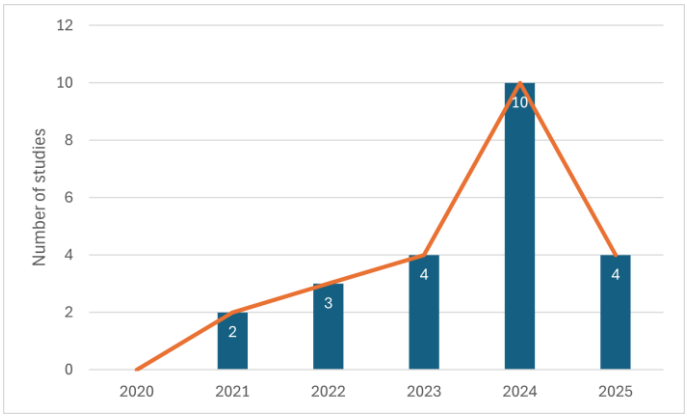

Figure 4. Number of studies on AppSheet attendance systems from 2020-2025

The rise in publications also indicates growing academic interest in no-code platforms for organizational processes. While early studies were largely descriptive, more recent works have started to

explore technical configurations and sector-specific applications, suggesting a shift toward more systematic assessments of AppSheet's impact.

3.4 Limitations and Future Research

This systematic review provides new insights into AppSheet-based no-code attendance systems while also highlighting important limitations. The findings confirm AppSheet's potential to streamline processes, enhance verification through GPS and QR codes, and offer cost-effective solutions across sectors. However, the evidence base remains relatively narrow: most studies were descriptive, concentrated in the education sector, and lacked methodological rigor, which limits the generalizability of the conclusions.

Several limitations should be acknowledged. First, the literature search relied primarily on Google Scholar, which, although comprehensive, does not offer the same indexing rigor and quality control as major academic databases such as Scopus, Web of Science, IEEE Xplore, and ScienceDirect. Second, restricting the review to English and Indonesian sources may have introduced language bias. Third, although the CASP checklist was applied, the descriptive nature of many studies constrained the depth of quality appraisal [60]. Future research should expand coverage to multiple databases, include multilingual sources, and adopt stronger appraisal frameworks. On the technical side, opportunities exist to integrate AppSheet with biometric authentication, blockchain-based security, and ERP systems to strengthen reliability, scalability, and institutional adoption. Addressing these gaps will not only improve methodological robustness but also position AppSheet as a more mature and scalable alternative for digital attendance management in education, government, and industry.

4. CONCLUSION

This study presents the first systematic review focusing on AppSheet-based no-code attendance systems, synthesizing 23 relevant studies. The findings confirm that AppSheet consistently enhances process optimization, data reliability, accountability, and user satisfaction compared to manual methods. Two dominant feature sets were identified—GPS with selfie verification and QR code validation—both balancing security and usability. Adoption was found to be heavily concentrated in the education sector, with emerging but limited applications in government and industry. These results highlight AppSheet's unique position as a low-cost and accessible solution for organizations seeking lightweight digital transformation.

From a practical perspective, AppSheet offers institutions, especially in education and resource-constrained environments, a flexible platform for digitalizing attendance without relying on costly biometric or RFID infrastructures. From a theoretical perspective, this review enriches the literature on no-code application development by demonstrating how AppSheet empowers non-technical users to design functional systems tailored to organizational needs.

Future research should integrate AppSheet with biometric authentication, blockchain-based security, or ERP systems to address current limitations and enable large-scale adoption. Furthermore, expanding systematic reviews beyond Google Scholar to include additional major academic databases, such as Scopus, Web of Science, IEEE Xplore, and ScienceDirect, along with more rigorous quality appraisal frameworks, may strengthen the evidence base on no-code platforms for attendance management.

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