

N8n Based Digital Marketing Workflow Automation for the Operational Efficiency of a Service Company

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Keywords:

digital marketing, low code, n8n, operational efficiency, workflow automation

ABSTRACT

Digital marketing teams in service companies still spend much of their day on manual operational work, from consolidating leads that arrive through multiple channels and forwarding each one to the sales team, to compiling periodic reports for management. This study aims to design, implement, and evaluate digital marketing workflow automation based on n8n, an open source low code workflow automation platform, to improve the operational efficiency of a service company. The research takes a qualitative, descriptive case study approach in the digital marketing division of a multi brand service company in West Java, Indonesia. Data were collected through participant observation, workflow documentation, and interviews with internal users, then analyzed through data condensation, data display, and conclusion drawing. The study produces three findings. First, four of the most burdensome manual workflows were identified: multi channel lead consolidation, lead distribution to sales teams, weekly performance reporting, and content monitoring. Second, all four were automated through n8n workflows that connect web forms, social media lead forms, a master spreadsheet, and instant messaging channels under one trigger, normalization, storage, and notification architecture. Third, automation cut the cycle time from lead arrival to sales notification from hours to seconds, removed duplicate entries and stray leads, and made weekly reporting consistent without manual work. The findings show that a low code platform such as n8n lets a mid sized service company build the kind of marketing automation long associated with expensive commercial software, provided data schema discipline and operational governance come with it.



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INTRODUCTION

Digital transformation has fundamentally changed how service companies acquire customers, manage marketing activities, and coordinate interactions between marketing and sales departments. The increasing adoption of websites, social media platforms, online advertising, and digital communication channels has created opportunities for

businesses to reach wider markets and improve customer engagement. However, the expansion of digital marketing channels has also introduced operational challenges, particularly in managing information generated across multiple platforms. Chaffey and Ellis-Chadwick (2019) emphasize that effective digital marketing requires the integration of digital technologies, customer information, and organizational processes to support marketing objectives. Similarly, Kannan and Li (2017) explain that digital marketing involves interconnected technologies, customer interactions, and organizational capabilities that influence marketing effectiveness. These perspectives indicate that successful digital marketing depends not only on promotional strategies but also on the efficiency of the operational processes supporting them.

In service companies, digital marketing operations frequently involve repetitive administrative activities, including collecting prospective customer information, consolidating leads from different channels, distributing inquiries to sales teams, monitoring content performance, and preparing management reports. These activities become increasingly complex when companies manage multiple brands, each with separate marketing channels, customer segments, and sales teams. Lead information obtained through landing pages, social media forms, and other digital sources may require manual processing before reaching the appropriate sales personnel. Consequently, fragmented workflows can create delays, inconsistent data formats, duplicate records, and additional administrative workloads. Such inefficiencies may reduce the responsiveness of marketing operations and limit employees' capacity to focus on strategic activities, including campaign optimization, content development, and customer relationship management.

Marketing automation has emerged as an important approach to addressing these operational challenges. Heimbach et al. (2015) describe marketing automation as a technological approach that supports the systematic execution and coordination of marketing activities. Järvinen and Taiminen (2016) examined marketing automation in business-to-business content marketing and highlighted its relevance to lead management and marketing processes. Furthermore, Mero et al. (2020) investigated effectual and causal reasoning in marketing automation adoption, providing insights into how organizations develop automation capabilities according to their available resources and strategic objectives. These studies establish that marketing automation can support organizational marketing activities, although the practical implementation of automation depends on technological readiness, organizational resources, and process characteristics.

Beyond marketing-specific applications, the broader literature on robotic process automation (RPA) provides a theoretical and practical foundation for understanding workflow efficiency. Van der Aalst et al. (2018) discussed the potential of RPA to automate repetitive, rule-based organizational tasks, while Hofmann et al. (2020) examined its characteristics and implications for business processes. Syed et al. (2020) further identified contemporary themes and challenges associated with RPA implementation, including organizational integration, process suitability, and operational

management. Meanwhile, Aguirre and Rodriguez (2017) presented a case study of business process automation, demonstrating the relevance of automation technologies to organizational workflows. Lacity and Willcocks (2016) also discussed service automation as an approach to improving operational processes. Collectively, these studies indicate that automation is particularly relevant to activities characterized by repetitive procedures, structured data, and predictable decision rules.

Nevertheless, implementing automation through conventional commercial software may present challenges for small and medium-sized service companies, particularly when organizations must integrate multiple applications while maintaining operational flexibility. Low-code and no-code development platforms offer an alternative by enabling users to design and connect digital workflows through visual interfaces with limited conventional programming requirements. Bock and Frank (2021) examined the characteristics of low-code platforms, while Sahay et al. (2020) discussed approaches to understanding and comparing low-code development environments. These studies highlight the potential of low-code technologies to support application development and system integration. Within this technological landscape, n8n provides a workflow automation environment through which organizations can connect applications, process data, establish conditional operations, and automate information exchange across digital systems.

Recent studies in Indonesia have begun examining the application of n8n across different organizational settings. Pratama and Voutama (2026) investigated workflow automation efficiency using n8n and reported improvements in the speed of data transmission between integrated applications. Wali et al. (2025) examined the implementation of n8n-based workflow automation in a sharia cooperative in Aceh, highlighting its relevance to operational efficiency and organizational performance. These investigations demonstrate the practical potential of n8n in automating routine organizational processes. However, their research settings and operational objectives differ from the requirements of multichannel digital marketing management in service companies.

Other studies have explored n8n applications in specific business and information management activities. Al Fajar et al. (2026) developed an automated service workflow for a laundry business, while Sholihah et al. (2026) investigated a workshop registration system integrating an artificial intelligence chatbot and multichannel notifications. Pratama and Ahda (2025) examined an n8n-based AI agent for automated digital receipt recording, whereas Ahmad et al. (2026) investigated workflow automation for a web-based stock analysis agent. These studies contribute empirical examples of low-code automation in consumer services, transaction documentation, registration systems, and information processing. Nevertheless, their findings primarily concern individual service processes or specific application functions rather than the integrated management of lead acquisition, sales distribution, performance reporting, and content monitoring across multiple brands.

Despite the growing literature on marketing automation, RPA, and low-code platforms, several research gaps remain. First, previous marketing automation studies have predominantly emphasized customer engagement, lead nurturing, and marketing technology adoption, while the operational integration of repetitive digital marketing workflows has received comparatively less attention in the literature reviewed. Second, existing n8n studies have generally examined automation within individual services or narrowly defined administrative processes, leaving limited empirical evidence concerning integrated workflow automation across multiple marketing channels and brands within a single service company. Third, previous investigations have not sufficiently addressed how n8n-based workflow integration can be evaluated simultaneously through lead-processing cycle time, data quality, and reporting consistency in this particular organizational context. Fourth, although low-code platforms reduce technical development barriers, further contextual evidence is needed regarding the organizational governance, data standardization, and infrastructure requirements necessary to sustain automated marketing operations.

These research gaps are particularly relevant to multibrand service companies, where operational complexity increases as organizations expand their digital marketing channels and customer acquisition activities. Without an integrated workflow architecture, information generated from different platforms may remain fragmented, requiring repeated manual processing and coordination between marketing and sales personnel. The resulting inefficiencies create a practical need for automation solutions that are adaptable to existing organizational systems and operational resources. Consequently, investigating n8n-based automation within an actual multibrand service company provides an opportunity to understand how low-code technology can support operational integration while identifying the technical and organizational conditions influencing its implementation.

The novelty of this study lies in its contextual and operational examination of n8n-based digital marketing workflow automation within a multibrand service company in West Java, Indonesia. Unlike previous studies focusing on individual administrative functions, the present research integrates four interconnected digital marketing processes: multichannel lead consolidation, automated lead distribution to sales teams, weekly performance reporting, and content monitoring. These processes are organized through a common four-layer architecture consisting of triggers, data normalization, centralized storage, and automated notifications. Furthermore, the study evaluates automation outcomes through three complementary dimensions of operational efficiency: processing cycle time, data quality, and reporting consistency. This integrated perspective provides a contextual contribution to understanding how low-code automation can be implemented across interconnected marketing activities rather than isolated tasks.

An additional contribution of this study concerns the relationship between technological automation and operational governance. Although low-code platforms simplify workflow development, sustainable implementation requires consistent data

structures, reliable system infrastructure, secure application integration, and clearly defined operational responsibilities. Accordingly, this research examines not only the technical design of automated workflows but also the practical considerations associated with their maintenance and reliability. This perspective extends the discussion of workflow automation beyond technological functionality by emphasizing the organizational arrangements required to maintain operational efficiency.

Based on these considerations, this study aims to design, implement, and evaluate n8n-based digital marketing workflow automation to improve the operational efficiency of a multibrand service company. Specifically, the research seeks to identify repetitive manual workflows that contribute to operational inefficiency, develop an integrated automation architecture connecting digital marketing channels with centralized data management and sales notifications, and evaluate the observed changes in processing cycle time, data quality, and reporting consistency following implementation. Through a qualitative descriptive case study, the research examines these processes within their actual organizational context to provide a detailed understanding of the automation implementation and its operational outcomes.

Theoretically, this study contributes to the literature on digital marketing automation, business process automation, and low-code technology adoption by providing empirical insights into the integration of interconnected marketing workflows. It also extends discussions of organizational automation by highlighting the relationship between process standardization, technological integration, and operational governance. Practically, the findings are expected to benefit digital marketing managers, sales teams, automation developers, and service company decision-makers by providing a reference for identifying automation priorities, designing integrated workflows, and establishing operational controls. The proposed architecture may also serve as a contextual reference for organizations seeking to reduce repetitive administrative work while improving the consistency of information exchange across marketing and sales functions.

The managerial implications of this research emphasize the importance of selecting repetitive and rule-based processes as initial automation priorities, establishing standardized data structures before integrating multiple applications, and implementing reliable monitoring mechanisms to maintain workflow continuity. For small and medium-sized service companies, the findings may inform decisions concerning the adoption of self-hosted, low-code automation as an alternative to more complex commercial integration systems. However, the study does not establish that n8n is universally more cost-effective than commercial alternatives, as a formal comparative cost analysis was not conducted. Furthermore, because the investigation focuses on a single organizational case, its findings are intended to provide analytical and practical insights rather than statistically generalizable estimates of automation effectiveness. Ultimately, this research seeks to demonstrate how integrated workflow automation can support more responsive, consistent, and manageable digital marketing operations while identifying the governance requirements necessary for sustainable implementation.

METHOD

Research Design

This study takes a qualitative approach in the form of a descriptive case study. The case study design fits because the research examines a contemporary phenomenon, digital marketing workflow automation, inside its real organizational context, where the boundary between phenomenon and context cannot be drawn sharply (Yin, 2018). The research ran in four stages following a system design cycle: identifying the manual workflows, designing the automation architecture, implementing the workflows on the n8n platform, and evaluating operational efficiency qualitatively after implementation. Figure 1 presents the stages.

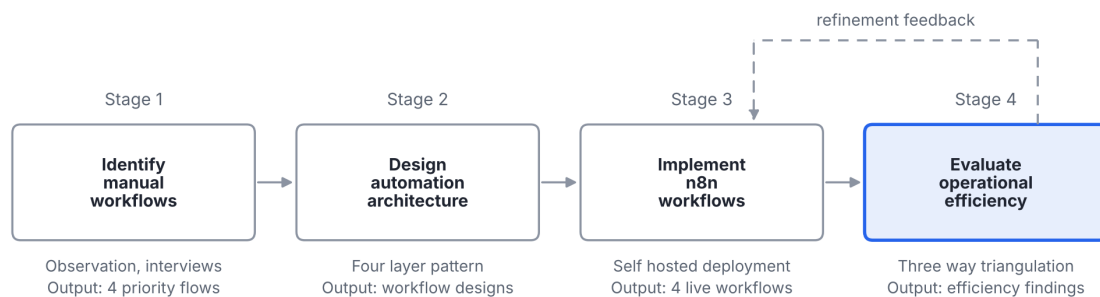


Figure 1. Research Stages

Source: compiled by the researcher (2026)

Research Subject and Setting

The setting is the digital marketing division of a multi brand service company headquartered in West Java that serves a national market. The division manages lead acquisition for more than a dozen service brands through landing page forms, social media lead forms, and organic blog traffic, with a separate sales team per brand. The company's identity is anonymized at the organization's request. Research subjects include the automation manager, digital marketing staff, and sales team representatives as downstream users of the automated workflows.

Data Collection Techniques

Data were collected in three ways. First, participant observation, since the researcher was directly involved in designing and operating the workflows and could watch work before and after automation from the inside. Second, documentation, covering n8n workflow diagrams, the master lead spreadsheet structure, workflow execution logs, and archived weekly reports. Third, unstructured interviews with marketing staff and the sales team about administrative workload before automation and the changes felt afterwards. Together, the three allow cross checking between what was

designed, what actually ran in the system, and what users experienced. Table 1 summarizes the techniques, their data sources, and their outputs.

Table 1. Summary of Data Collection Techniques

Technique	Data source	Instrument	Output
Participant observation	Daily activities of the marketing division before and after automation	Field notes	Map of manual workflows and bottlenecks
Documentation	N8n workflow diagrams, master spreadsheet, execution logs, archived weekly reports	Document review sheet	Evidence of the design and of the running system
Unstructured interviews	Digital marketing staff and sales team representatives	Open question guide	Perceived workload and perceived change

Source: compiled by the researcher (2026)

Data Analysis Technique

The analysis followed the three concurrent flows of qualitative analysis: data condensation, data display, and conclusion drawing and verification (Miles et al., 2014) . In condensation, observation notes and interview material were coded into workflow categories, bottlenecks, and efficiency dimensions. In display, each workflow was presented as a before and after pair alongside the architecture that replaced it. In conclusion drawing, the changes on three efficiency dimensions, cycle time, data quality, and reporting consistency, were read against the automation literature to establish the contribution and its limits.

Trustworthiness

Trustworthiness rests on technique triangulation, comparing observations, system documents, and user accounts before any efficiency claim is made; member checking, confirming workflow descriptions with the staff who run them; and an audit trail in the form of workflow execution logs that can be reinspected. The study's main limitation is its position as a single case with qualitative evaluation, so the magnitudes of efficiency gains are not meant to generalize statistically to the population of service companies.

RESULTS AND DISCUSSION

Identifying the Manual Workflows

Early observation and interviews identified the four manual workflows that weighed most heavily on the digital marketing division. First, multi channel lead consolidation. Leads arrive from each brand's landing page forms, from Meta and TikTok lead forms, and from blog article tracking forms, and staff copy them one by one into a master spreadsheet, each channel in a different format. Second, lead distribution to the sales teams. Every new lead has to be forwarded by hand to the instant messaging group of the relevant brand's sales team, so leads that arrive at night or on weekends wait until the next day. Third, weekly performance reporting. Staff recap lead counts per brand and per channel from several data sources and assemble them into a management report, work that eats up to half a working day every week. Fourth, content monitoring, checking new blog articles across brands and making sure each one is wired into the lead source tracking mechanism.

The four workflows share the same profile: repetitive, governed by clear rules, high in volume, built on moving data between applications, and rarely in need of human judgment. That profile matches exactly the kind of task the robotic process automation literature marks as most worth automating (Syed et al., 2020; van der Aalst et al., 2018), so the four became the design targets.

The business cost of the manual flows is real and compounding. A lead that waits goes cold, because prospective service customers typically contact several providers at once and choose whoever responds first, so every hour of notification delay risks a lost transaction. Manual copying also imposes cognitive load, since staff juggle multiple channels while doing other work, a condition under which lapses are a consequence of work design rather than of discipline. Automation priority was therefore set with three plain considerations, event volume per day, repetition frequency, and clarity of the decision rule; consolidation and distribution ranked highest because all three considerations peak there.

Designing the Automation Architecture

The architecture was built on self hosted n8n so that lead data stays under the company's control. Every workflow follows the same four layer pattern. The trigger layer receives events, whether a webhook from a landing page form, periodic pulls of social media lead form data, or a scheduler for recurring tasks. The normalization layer reshapes data from each channel's format into one standard schema holding the lead's identity, target brand, source channel, and source article where relevant. The storage layer appends a row to the master lead spreadsheet that serves as the single source of truth across brands. The notification layer sends a lead summary to the relevant brand's sales messaging group in a uniform message format. The layered pattern means adding a new channel or brand only takes copying a workflow and changing its trigger parameters, with no architectural rework. Figure 2 visualizes the system.

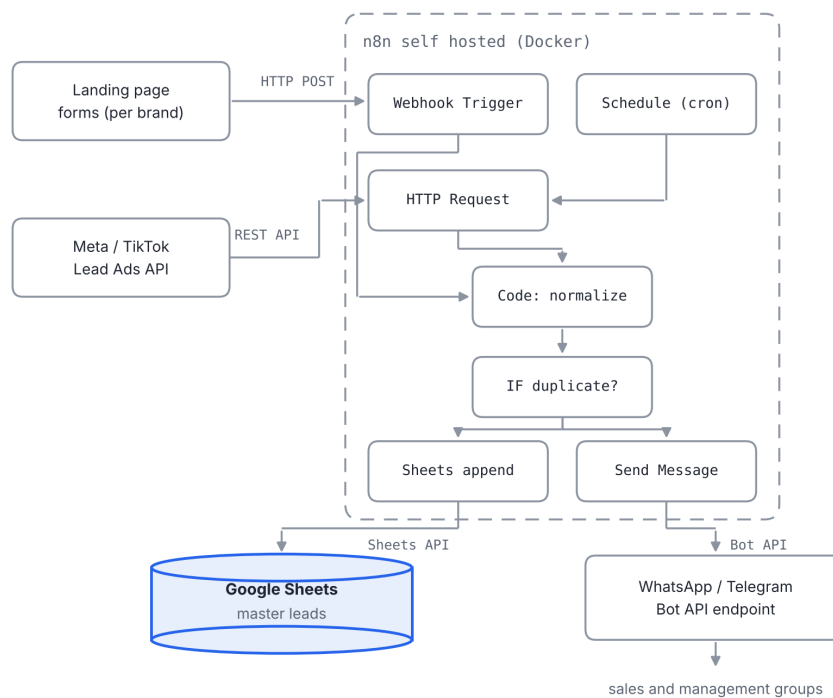


Figure 2. N8n Based System Architecture

Source: compiled by the researcher (2026)

Several design decisions were made deliberately from the start. First, n8n was self hosted on a company server instead of a per execution cloud plan, because high daily execution volume makes per task pricing balloon quickly, and prospective customer contact data was judged too sensitive to route through a third party. Second, every workflow was designed to be idempotent, meaning a repeated execution of the same event produces no duplicate row or notification, through a unique key check before any write. Third, credentials for all services live in n8n's built in credential manager rather than inside nodes, so password rotation never requires editing a workflow. Fourth, the master spreadsheet was declared the single source of truth; other applications may read from it, but only workflows may write to it, a rule that blocks the return of the very manual entry the system was built to remove.

Implementing the Automation Workflows

Four workflows went live as designed. The first, lead consolidation, receives webhook submissions from all landing page forms and pulls social media lead form data on a schedule, normalizes them, and appends them to the master spreadsheet tagged with brand and channel. Duplication is blocked by a contact number check before any new row is written. The second, lead distribution, fires the moment a new row lands: the system reads the target brand, composes a lead summary, and sends it to that brand's sales

messaging group, complete with the source article when the lead came from the blog, so the sales team knows the prospect's context from the first message.

The third workflow, weekly reporting, runs on a schedule at the start of each week. The system reads the master spreadsheet, computes lead recaps per brand and per channel for the past week, compares them with the week before, and sends the summary to the management group with no staff involvement. The fourth, content monitoring, periodically checks new blog articles on each brand site, flags any article not yet wired into lead source tracking, and reports it to the content manager. Every workflow writes execution logs in n8n, and a failed execution fires its own alert to the automation manager, so disruptions get handled the same day.

Implementation was not entirely smooth, and three technical lessons are worth recording. First, the variety of data formats across channels made the normalization layer the most revised part of the system; without a standard schema from day one, the master spreadsheet dirties fast. Second, third party API quotas forced deliberate pacing and scheduling so data pulls would not be rejected. Third, the reliability of the automation rests on the reliability of the server n8n runs on, which makes server availability monitoring an operational precondition rather than an afterthought.

So that the automation would not depend on one person's memory, operational governance was set up alongside implementation. Every workflow carries a uniform name encoding brand, function, and version, which keeps dozens of workflows traceable across brands. Changes to a live workflow are made by duplicating and testing a copy first, never by editing production directly, and each workflow has a short note on its trigger, its output, and who is affected if it stops. The automation manager role is explicit: sole owner of the whole system, responsible for checking daily failure logs, reviewing API quotas, and acting as first contact when field teams spot odd data. Such governance sounds administrative, but it is what separates automation that lasts from experiments that quietly die once their builder gets busy.

Evaluating Operational Efficiency

The evaluation covers three dimensions. The first is cycle time. Before automation, the gap between a lead arriving and the sales team being notified depended on when staff happened to check a channel, so it could stretch to hours, and leads outside working hours waited until the next day [insert: average response time before automation based on internal records]. After automation, notifications go out within seconds of arrival on every connected channel, in line with M. I. Pratama and Voutama's (2026) finding that n8n moves data between platforms in under two seconds. The second is data quality. Duplicate entries and stray leads, once routine, practically disappeared because every channel now drains into one master spreadsheet with duplicate checking, and every lead carries the channel and source article tags that used to be forgotten. The third is reporting consistency. The weekly report that once consumed up to half a working day and kept

changing shape now publishes automatically on the same schedule in a uniform structure, which moved management discussion from verifying the numbers to acting on them.

Interviews with internal users reinforce the three changes. Marketing staff say the time once lost to copying data has shifted to content production and channel experiments, while the sales team values the source article context on notifications for opening conversations with prospects. This matches the classic automation argument that the greatest value of machines is not replacing people but freeing them from repetition (van der Aalst et al., 2018), and Wali et al.'s (2025) finding that n8n modules cut response times and entry errors in a microfinance service organization.

Beyond the three main dimensions, the evaluation recorded two further consequences. On scalability and cost, adding a new brand or channel now carries a marginal cost close to zero, a workflow copy and a parameter change, whereas under manual operations every new brand meant extra recap work that eventually demanded extra people; self hosting also keeps platform cost from growing with execution volume. On risk, automation creates a new fragility, dependence on server availability and on a single automation manager; when the server goes down, the whole lead pipeline stops, something that never happened when everything was manual because staff could always copy by hand. The mitigations are automatic failure alerts, periodic workflow configuration backups, and documentation that lets other staff take over; the efficiency gained, in other words, is paid for with a new kind of operational discipline.

Discussion

Compared with the existing literature, this study contributes in three ways. First, context. Earlier n8n studies each work on a single service, stock analysis (Ahmad et al., 2026), a laundry business (Al Fajar et al., 2026), workshop registration (Sholihah et al., 2026), digital receipt logging (W. Pratama & Ahda, 2025), or a cooperative (Wali et al., 2025); this study shows the same four layer pattern scaling automation across more than a dozen brands and many channels at once, the ordinary condition of a multi brand service company. Second, the position of automation within the marketing function. The marketing automation literature mostly discusses commercial tools for lead nurturing (Heimbach et al., 2015; Järvinen & Taiminen, 2016); this study shows that the operational layer beneath it, consolidation, distribution, and reporting, can be built in house on an open source low code platform at marginal cost, which lowers the price barrier that has kept mid sized companies away from marketing automation (Sahay et al., 2020) . Third, the sociotechnical side. The automation does not run itself; its reliability depends on data schema discipline, server monitoring, and one automation manager who understands both the business process and the platform. Low code technology lowers the technical barrier, but it relocates the critical point to process and data governance, a finding that matters to any organization planning to copy this approach.

Theoretically, the findings enrich two conversations at once. For the marketing automation literature, this case shows the effectual adoption path described by Mero et al. (2020) in its most concrete form: an organization builds automation capability step by

step from means it already owns, a spreadsheet, messaging channels, an internal server, instead of waiting for the budget for commercial software. For the process automation literature, n8n occupies an interesting position between robotic process automation that mimics human clicks on interfaces and API based application integration; because it works directly at the API layer, an n8n workflow is not brittle to interface changes, the classic weakness of RPA (Syed et al., 2020). Practically, the findings offer a replicable path for other service companies in three steps: map the repetitive high volume workflows, fix the data schema and the single source of truth before building the first workflow, then grow the automation layer by layer along the trigger, normalization, storage, and notification pattern.

CONCLUSION

This study shows that n8n based digital marketing workflow automation can raise the operational efficiency of a multi brand service company on three dimensions at once: lead handling cycle time falls from hours to seconds, data quality improves as duplicate entries and stray leads are eliminated by a single source of truth, and weekly reporting becomes consistent without manual work. The four automated workflows, multi channel lead consolidation, lead distribution, performance reporting, and content monitoring, were all built on one four layer architecture of trigger, normalization, storage, and notification, which proved easy to replicate across brands and channels. The findings confirm that an open source low code platform lowers the cost barrier of marketing automation for mid sized companies, with the caveat that its success rests on data schema discipline, infrastructure monitoring, and the presence of an automation manager who understands the business process.

For practitioners, the results suggest starting automation from workflows that are repetitive, clearly rule bound, and high in volume, and fixing a standard data schema before the first workflow is built. For future research, three directions stand open: quantitative measurement of automation's effect on lead to customer conversion, comparison across workflow automation platforms on the same workload, and study of artificial intelligence agents on n8n for automatic lead qualification, a path recent studies have begun to explore.

FUNDING

The author(s) declared that financial support was not received for this work and/or its publication.

CONFLICT OF INTEREST

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHOR CONTRIBUTIONS

If applicable, the Author's Contribution Statement.

GENERATIVE AI STATEMENT

The author(s) declared that generative AI was used in the creation of this manuscript. The author(s) wish to acknowledge the use of Generative AI for refining the language clarity and grammatical structure of this manuscript. This application was conducted in adherence to established ethical guidelines regarding the use and disclosure of generative AI in scholarly research. Each author has provided substantial intellectual contributions to the work, which has been rigorously vetted for accuracy, and the author(s) assume full responsibility for the integrity and final content of the manuscript.

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