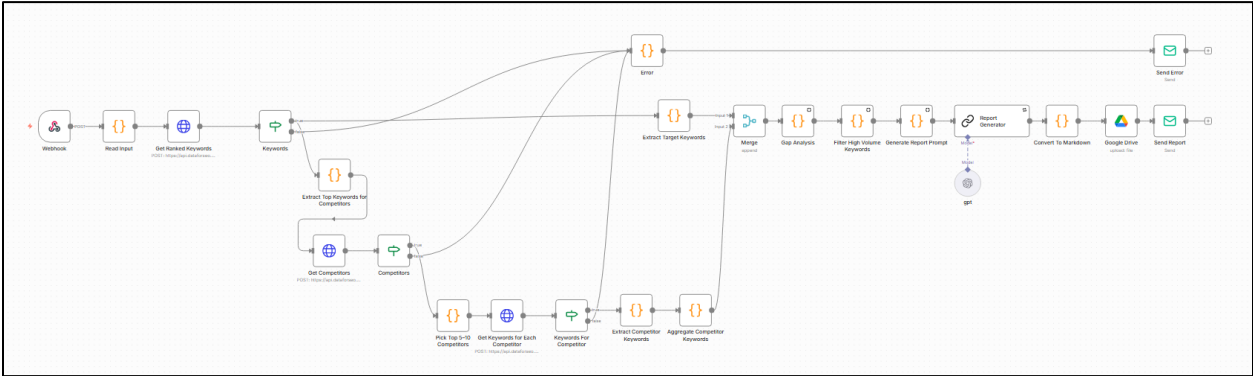
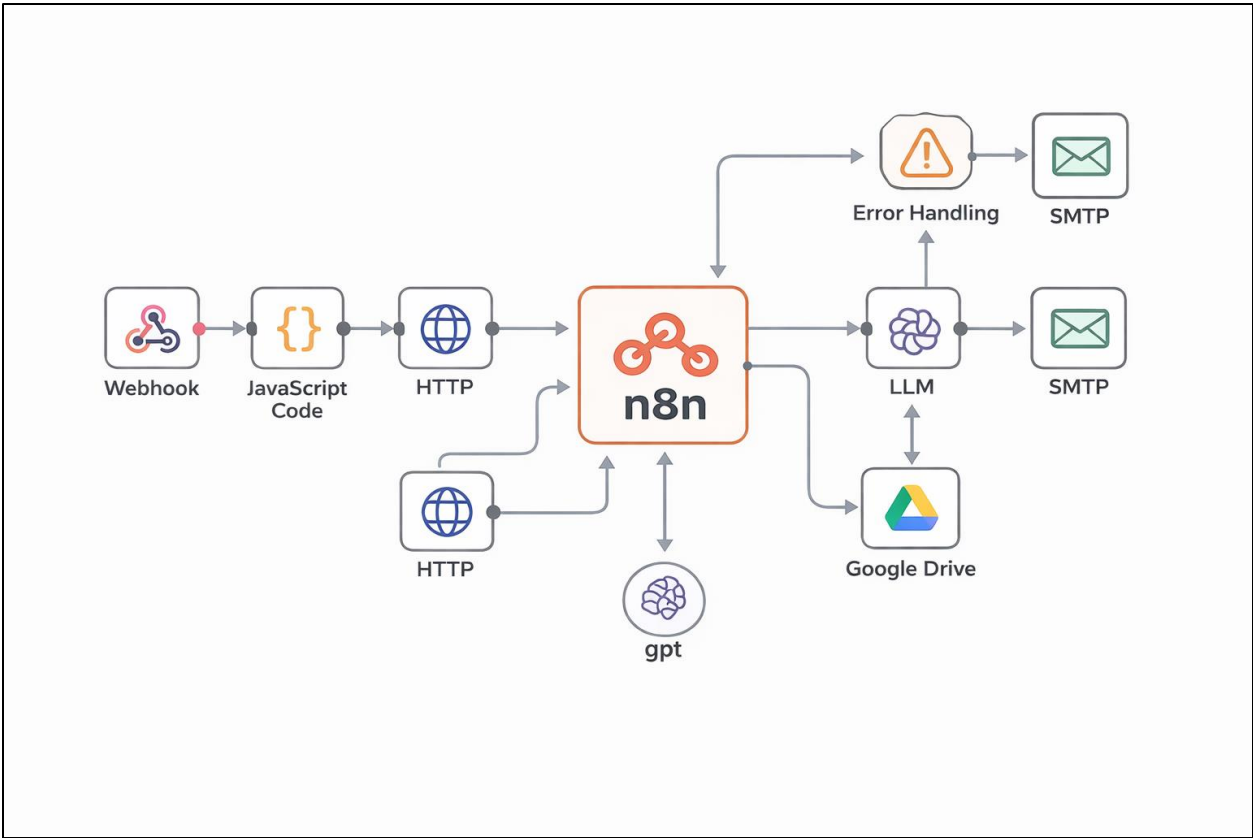


# Automated Competitor & Keyword Research Tool

## Workflow



## Workflow Architecture



## **Executive Summary**

The Automated Competitor & Keyword Research Tool is a production-grade, fully automated SEO workflow built on n8n. It accepts a website URL and email address, automatically discovers top organic competitors, collects large-scale keyword data from DataForSEO, performs a keyword gap analysis between the target site and competitors, and uses OpenAI (GPT-4.1-mini) to generate a comprehensive, human-readable Markdown report. The report is uploaded to a dedicated Google Drive folder and a branded HTML email is sent via SMTP, containing a direct link to the report. From a business perspective, the workflow replaces 1–3 hours of manual analyst work (data extraction, cleaning, gap analysis, and reporting) with a sub-minute, highly repeatable process that costs only  $\approx$  \$0.137 USD per full execution in DataForSEO fees, plus minimal OpenAI and infrastructure costs.

## **Business Problem Statement**

Modern SEO and growth teams face significant challenges when conducting competitor and keyword research, including time-intensive manual workflows, inconsistent reporting, slow turnaround, and limited reuse of previous analyses. Analysts often need to log into multiple platforms, export spreadsheets, deduplicate data, cross-reference competitors, and manually format findings into client-ready reports—an error-prone process that is difficult to scale across multiple clients or brands. Additionally, each analyst may follow their own approach, resulting in reports that vary in structure, metrics, and depth, which reduces clarity for stakeholders. Generating competitor keyword reports for pre-sales, audits, or campaign planning can take days, slowing decision-making and limiting the ability to quickly validate SEO opportunities. Traditional research is often “one-off,” requiring repeated effort even for similar analyses. The business problem, therefore, is how to automate and standardize competitor-driven keyword research so that reports are fast to produce, outputs are consistent and understandable for non-technical stakeholders, costs remain predictable when scaling, and the process can be triggered automatically via an API or simple web form. The Automated Competitor & Keyword Research Tool is designed to address these challenges, streamlining research, improving accuracy, and enabling scalable, repeatable insights.

## **Solution Overview**

The Automated Competitor & Keyword Research Tool combines an n8n workflow with a simple web frontend and supporting documentation to automate competitor and keyword research.

### **Core Components:**

#### **Trigger / Input:**

- Webhook accepts target\_url, email, location\_name, language\_name (defaults applied if missing).
- Input is normalized (domain, location\_code, language\_code).
- Target Keyword Collection:
- Fetches top keywords for the target site using DataForSEO API.
- Extracts top 50 keywords for competitor discovery.

#### **Competitor Discovery:**

- Identifies top competitors via SERP analysis.
- Selects 5–10 competitors for keyword collection.
- Competitor Keyword Collection:
- Fetches up to 1000 keywords per competitor.
- Normalizes and validates data (keyword, search\_volume, competition, CPC, difficulty, rank, intent).

#### **Aggregation & Gap Analysis:**

- Deduplicates and merges target & competitor keywords.
- Identifies gap keywords (opportunities not covered by target site).

#### **Filtering & Prioritization:**

- Filters by minimum search volume & rank.
- Sorts by search volume to highlight top opportunities.

#### **Report Generation:**

- Generates Markdown report prompt for LLM (SEO consultant persona).
- GPT-4.1-mini produces complete SEO keyword gap report.

#### **Storage & Delivery:**

- Converts report to Markdown file.

- Uploads to Google Drive and emails the link to user.

### **Error Handling:**

- Normalizes API errors and sends alert emails with error details.

### **Scope**

- Target keyword extraction for a single website per execution.
- Automated discovery of organic competitors using SERP overlap.
- Download of up to 200 target keywords and up to 1000 competitor keywords per competitor.
- Keyword deduplication, gap detection, and filtering based on search volume and rank.
- Markdown report generation with summary metrics and prioritized opportunities.
- Automated Google Drive upload and branded email notification.
- Error detection for major external dependencies (DataForSEO) and email notification on failures.

### **Key Business Benefits**

#### **Radical Time Reduction**

- Converts a multi-hour, multi-tool workflow into a single automated task that completes in less than a minute.
- Lets SEO teams run sophisticated analyses on demand, without needing dedicated analyst time per run.

#### **Consistent, High-Quality Reporting**

- Every report follows a defined structure: Introduction → Key Stats → Top Gap Keywords (by competitor) → Next Steps.
- GPT-4.1-mini transforms raw metrics into clear narrative and recommendations tailored for non-technical stakeholders.
- The markdown output is portable and can be converted to documents, wiki pages, or presentation notes.

#### **Scalability & Automation**

- Works as an API (webhook), a web form, or can be integrated into other automation flows (e.g., CRM-triggered audits when a new client is created).
- n8n's execution engine can scale horizontally with your infrastructure.

## Use Cases / Scenarios

- **Agency Sales Enablement:** Salesperson inputs prospect's site; prospect receives a personalized competitor keyword gap report within minutes.
- **Client Onboarding:** CSM triggers workflow for new clients to define initial keyword strategy and track competitive changes quarterly.
- **Internal Product / Feature Planning:** Product and growth teams analyze competitor keywords to plan content, landing pages, and campaigns.
- **Lead Magnet / Self-Serve Tool:** Marketing offers a free report via a landing page to capture qualified leads automatically.
- **Audit & Monitoring:** Monthly reports track competitor keyword movements for timely content and PPC updates.

## Target Audience

- **SEO Agencies and Consultants:** Need repeatable, data-backed competitor keyword research at scale.
- **In-House Marketing / Growth Teams:** Require quick, self-service insights to inform campaigns and content roadmaps.
- **Sales & Customer Success:** Use reports as pre-sales assets and QBR materials.
- **Operations / Automation Engineers:** Integrate this workflow into broader marketing automation stacks.
- **Founders & Product Managers:** Leverage quick competitor keyword snapshots for strategic decisions, without deep SEO tooling knowledge.

## Security & Compliance Overview

1. **Inbound Data:** Users provide target URL, email, and optional location/language info.
2. **Outbound to APIs:** DataForSEO gets domains/params; OpenAI processes keyword metrics; Google Drive stores reports; SMTP sends emails.
3. **Transport Security:** All endpoints use HTTPS; SMTP via TLS/SSL; OAuth2 for Google Drive.
4. **Credential Management:** API keys stored securely in n8n; frontend has no access.
5. **Storage & Retention:** Reports in Google Drive; workflow logs per retention policy; emails stored on mail server.
6. **Compliance:** Only marketing contact info and public URLs processed; GDPR and data protection best practices recommended.

## Competitive Advantage / Differentiation

- ☐ Unified workflow replaces manual data collection and reporting.
- ☐ Focuses on real SERP competitors, not generic keyword suggestions.
- ☐ GPT-4.1-mini creates structured Markdown reports for easy business use.
- ☐ Clear pricing and execution under one minute.
- ☐ n8n allows cloning, customization, notifications, and logic adjustments without coding.

## Implementation & Onboarding (Client-Friendly)

### Step 1 – Import the Workflow

1. Open your n8n instance.
2. Go to Workflows → Import from File and select Automated Competitor & Keyword Research Tool.json.
3. Confirm that all nodes appear (Webhook, Read Input, Get Ranked Keywords, etc.).

### Step 2 – Set Up and Attach Credentials

#### 1. DataForSEO (HTTP Basic Auth):

- Go to Credentials → Add Credential → HTTP Basic Auth.
- Name: e.g., DataForSeo.
- Enter your DataForSEO username and password.
- Save.
- In the workflow: open Get Ranked Keywords, Get Competitors, and Get Keywords for Each Competitor and select the DataForSeo credential.

#### 2. OpenAI API:

- Go to Credentials → Add Credential → OpenAI API.
- Enter your OpenAI API key (with access to GPT-4.1-mini or equivalent).
- Save.
- In the gpt / Report Generator node, select this credential and ensure the model is set to gpt-4.1-mini.

#### 3. Google Drive OAuth2 API:

- Go to Credentials → Add Credential → Google Drive OAuth2 API.
- Follow the OAuth flow to authorize Google Drive access.
- Save.
- In the Google Drive node, assign this credential.

#### 4. SMTP (Email):

- Go to Credentials → Add Credential → SMTP.
- Enter SMTP host, port, username, password, and TLS settings.
- Save.

- In Send Report and Send Error nodes, select this SMTP credential.

### Step 3 – Configure Google Drive Folder & Email Fields

#### 1. In the Google Drive node:

- Set Drive to "My Drive" (or your target drive).
- Set Folder ID to the folder where you want reports stored.

#### 2. In the Send Report and Send Error nodes:

- Update fromEmail.
- Optionally adjust email subject lines and HTML copy to match your brand.

### Step 4 – Connect or Host the Web Interface

1. Place index.html on a static hosting provider or embed the content into your website.
2. If n8n instance is not n8n.programmx.com, update the fetch URL in the script.

### Step 5 – Test End-to-End

1. Use a test domain and own email address.
2. Confirm that:
  - n8n shows a successful execution.
  - A markdown file appears in the designated Google Drive folder.
  - Receive the email with the correct website name, date, filename, and working Google Drive link.
  - Once validated, toggle the workflow to Active so the webhook is live.

### Credentials to Add

1. **DataForSEO – HTTP Basic Auth:** Assigned to: Get Ranked Keywords, Get Competitors, Get Keywords for Each Competitor.
2. **OpenAI API Key:** Assigned to: gpt / Report Generator node.
3. **Google Drive OAuth2:** Assigned to: Google Drive node.
4. **SMTP (Email):** Assigned to: Send Report, Send Error.

These four credential sets are sufficient to operate the workflow end-to-end.

## DataForSEO Endpoints & Execution Details

### Endpoints

#### 1. Get Ranked Keywords:

**Endpoint:** [https://api.dataforseo.com/v3/dataforseo\\_labs/google/keywords\\_for\\_site/live](https://api.dataforseo.com/v3/dataforseo_labs/google/keywords_for_site/live)

**Usage in Workflow:**

- Fetches up to **200** ranked keywords for the **target domain**.
- Used to: Understand the current keyword footprint of the site.
- Provide the top 50 keywords (by search volume) for competitor discovery.

**Cost Calculation (Example):**

- Task cost: 0.01 USD per request.
- Cost per item: 0.0001 USD per keyword.
- The competitor discovery step uses 50 top keywords.
- Formula:
  - $\text{Total} = \text{task\_cost} + \text{items} * \text{cost\_per\_item}$
  - $\text{Total} = 0.01 + 50 * 0.0001 = 0.01 + 0.005 = 0.015 \text{ USD}$ .

#### 2. Get Competitors (SERP Competitors):

**Endpoint:** [https://api.dataforseo.com/v3/dataforseo\\_labs/google/serp\\_competitors/live](https://api.dataforseo.com/v3/dataforseo_labs/google/serp_competitors/live)

**Usage in Workflow:**

- Takes the list of top keywords from the target site.
- Returns up to **20 competitor items**, representing domains that often appear in SERPs for those keywords.
- The workflow uses this list to select the **top 5–10 competitors** for deeper analysis.

**Cost Calculation (Example):**

- Task cost: 0.01 USD.
- Cost per returned item: 0.0001 USD.
- Suppose the response returns 20 competitor items (based on `items_count / limit`):
- $\text{Total} = 0.01 + 20 * 0.0001 = 0.01 + 0.002 = 0.012 \text{ USD}$ .

#### 3. Get Keywords for Each Competitor:

**Endpoint:** [https://api.dataforseo.com/v3/dataforseo\\_labs/google/keywords\\_for\\_site/live](https://api.dataforseo.com/v3/dataforseo_labs/google/keywords_for_site/live)

**Usage in Workflow:**

- For each selected competitor domain.
- Fetches up to **1000 keywords**.
- These competitor keyword lists form the main input to the gap analysis step.

**Cost Calculation (Per Competitor Example):**

- Task cost: 0.01 USD.



- Cost per item: 0.0001 USD per keyword and example with items\_count = 1000:
- Total =  $0.01 + 1000 * 0.0001 = 0.01 + 0.10 = 0.11$  USD.

### **Execution Time**

All three DataForSEO calls, LLM generation, Google Drive upload, and email sending complete in less than 1 minute.

### **Conclusion**

The Automated Competitor & Keyword Research Tool delivers a complete, production-ready pipeline for competitor-driven keyword gap analysis with minimal manual effort. By combining DataForSEO for robust SERP and keyword data, OpenAI for narrative report generation, Google Drive for structured storage, and SMTP for branded delivery, it turns a traditionally complex SEO analysis into a single automated, low-cost, and repeatable process. Once configured with the appropriate credentials and endpoints, it can be triggered via API or a simple HTML form, making it accessible to both technical and non-technical teams and enabling consistent, scalable SEO insights across many domains.