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Spreadsheet-Based Process Automation for MSMEs: An Industry Experience-Based Case Study Using Google Apps Script

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Micro, Small and Medium Enterprises (MSMEs) form a critical part of the industrial ecosystem, yet many continue to face serious operational challenges due to poor data capture and lack of process automation. In a large number of MSMEs, business data is either not recorded systematically or is maintained in scattered Excel files. This leads to delays in decision making, difficulty during audits, inaccurate stock visibility, and excessive time spent in preparing reports. Drawing on practical industry engagement, this paper presents an experience-based case study of a spreadsheet-based automation solution developed using Google Apps Script. The solution covers the complete order-to-dispatch cycle and includes modules for order booking, material planning, purchase order management, production booking, inventory control, dispatch, and customer complaint handling. The paper discusses the real problems observed in MSMEs, the design of the automation solution, implementation experience, and the practical benefits achieved. The study shows that low-cost, spreadsheet-based automation can significantly improve data accuracy, reporting speed, stock visibility, and operational control in resource-constrained MSME environments.

Keywords: MSME, process automation, google apps script, spreadsheet automation, order management, inventory control, industry case study

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1. Introduction

Micro, Small and Medium Enterprises (MSMEs) play a vital role in employment generation, manufacturing output, and economic growth. Despite their importance, many MSMEs continue to operate with weak data systems and limited process automation. In day-to-day operations, data related to orders, materials, production, inventory, and dispatches is often either not captured properly or is maintained in multiple Excel files by different people.

The absence of structured data creates serious problems. Managers find it difficult to take timely decisions because accurate information is not available. During audits, companies face challenges in producing complete and consistent records. Report preparation becomes time-consuming because data has to be collected manually from different files and then consolidated.

Many MSMEs are aware of the need for digital systems, but full-scale ERP software is often expensive and complex for them. As a result, they continue with manual or semi-manual Excel-based methods. This paper presents a practical industry experience of addressing these problems through a spreadsheet-based automation solution built on Google Sheets using Google Apps Script. The solution was designed to automate the flow from order booking to dispatch in a simple and affordable manner.

2. Problems Observed in MSMEs

Through direct engagement with multiple MSMEs, especially in manufacturing and trading sectors, the following major problems were observed:

2.1. Absence of Systematic Data Capture

In several organizations, important operational data was not recorded in a structured way. Order details, material consumption, production output, and dispatch information were often maintained informally. Because of this, decision making became difficult and unreliable. Managers had to depend on verbal updates rather than actual data.

2.2. Heavy Dependence on Manual Excel Files

Where data was maintained, it was usually stored in separate Excel files. Different team members maintained their own sheets for orders, purchase, production, and stock. There was little automation, and reports had to be prepared by manually copying and consolidating data. This process was slow, error-prone, and time-consuming.

2.3. Poor Visibility of Stock and Material Requirements

Companies often struggled to know the exact stock availability and future material requirements. Without proper linkage between orders, material planning, and inventory, purchase decisions were delayed or made on approximate judgment.

2.4. Difficulty during Audits and Reviews

During internal or external audits, organizations faced problems in presenting complete and consistent data. Missing records, multiple versions of Excel files, and lack of process history created avoidable complications.

2.5. Slow Reporting and Follow-up

Preparing even basic reports on pending orders, production status, stock position, or customer complaints took considerable time. This reduced managerial efficiency and delayed corrective actions.

3. Design of the Spreadsheet-Based Automation Solution

To address the above problems, a spreadsheet-based automation system was developed using Google Sheets and Google Apps Script. The objective was to provide MSMEs with a low-cost, easy-to-use, and practical automation solution without forcing them into complex and expensive ERP systems.

The solution was designed to cover the complete cycle from order booking to dispatch and included the following modules:

3.1. Order Booking Module

Customer orders were recorded in a structured format. Once an order was booked, the data became available for material planning and further processing. This created a single source of order information.

3.2. Material Planning Module

Based on booked orders, the system helped in identifying material requirements. Users could check stock availability and understand what needed to be purchased. This improved planning accuracy and reduced last-minute material shortages.

3.3. Purchase Order Module

Purchase requirements generated from material planning could be converted into purchase records. This helped in tracking what was ordered, from whom, and in what quantity.

3.4. Production Booking Module

Production activities were recorded against orders. This provided visibility on what was produced, what was pending, and how production was progressing against customer requirements.

3.5. Inventory Module

Stock movements related to purchase, production, and dispatch were captured to maintain updated inventory status. This reduced dependence on manual stock registers and approximate estimates.

3.6. Dispatch Module

Finished goods dispatches against customer orders were recorded in the system. This helped in tracking delivery status and maintaining order completion records.

3.7. Customer Complaint Module

Customer complaints were logged and tracked in a structured manner. This helped organizations maintain complaint history and monitor closure status.

4. Implementation Experience

The solution was implemented in MSME environments where teams were already familiar with Excel-type working. Because the system was built on Google Sheets, the learning curve remained low. Staff members could continue working in a spreadsheet environment while gaining the benefits of automation through Google Apps Script.

During implementation, it was observed that the biggest initial challenge was discipline in data entry. Once teams started entering data regularly, the benefits became visible quickly. Reports that earlier took hours could be generated in a much shorter time.

Stock visibility improved, and managers could check order and production status without repeatedly asking team members.

The modular design also helped. Organizations could start with order booking and inventory, and later add purchase, production, dispatch, and complaint modules as per their readiness.

5. Observed Benefits

Based on practical implementation, the following benefits were observed:

Table 1: Problems and Improvements after Automation

Problem Area	Before Automation	After Automation
Data Capture	Missing or informal records	Structured digital data entry
Reporting	Manual and time-consuming	Faster report generation
Stock Visibility	Approximate / delayed	Improved real-time visibility
Order to Dispatch Flow	Disconnected Excel files	Linked process modules
Audit Readiness	Difficult and incomplete	Better traceability of records
Customer Complaints	Poor tracking	Structured complaint logging

Overall, the spreadsheet-based automation approach helped MSMEs move from scattered manual records to a more structured and traceable process flow, without the cost and complexity of full ERP implementation.

6. Discussion

The case demonstrates that many operational problems in MSMEs are not caused only by lack of advanced technology, but by the absence of structured data capture and simple process linkage. When order, material, production, inventory, and dispatch data remain disconnected, decision making and audit readiness both suffer.

Google Apps Script based automation offers a practical middle path. It retains the familiarity of spreadsheets while adding workflow logic, data validation, and automated reporting. For MSMEs with limited budgets and limited IT teams, this approach can deliver meaningful improvement in a relatively short time.

At the same time, the experience also shows that technology alone is not enough. Consistent data entry and managerial follow-up remain essential for sustained benefits.

7. Practical Implications

For MSME owners and managers, the key implication is that automation does not always require heavy software investment. Structured spreadsheet-based systems can significantly improve control if processes are clearly defined.

For consultants and solution providers, this case highlights the value of designing modular, low-cost automation tools that match the real working style of MSMEs rather than forcing complex enterprise systems on them.

For policymakers and support institutions, such models can be encouraged as practical digitalization pathways for smaller enterprises that are not yet ready for full-scale ERP adoption.

8. Conclusion

This paper presented an industry experience-based case study on spreadsheet-based process automation for MSMEs using Google Apps Script. The study identified common problems related to poor data capture, manual Excel dependence, slow reporting, weak stock visibility, and audit difficulties. It then explained how a modular automation solution covering order booking, material planning, purchase, production, inventory, dispatch, and customer complaints helped address these issues.

The experience suggests that affordable and familiar technologies, when applied with clear process design, can create significant operational improvement in MSME environments. Future work may document comparative results across more firms and measure quantifiable gains in time saving, error reduction, and decision quality.

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