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A Study of Supply Chain Operations and Master Data Localization with Proposed AI Implementation at Atlas Copco

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***Abstract*— The quality of the procurement master data influences the decisions that manufacturers make in their sourcing process, which in turn has an impact on lead times, inventory and delivery reliability. Reliable records and balancing supplier metrics are highlighted in the literature on supply chain performance, data quality and TCO and supply risk, and more automated support is discussed in the literature on procurement digitalisation and AI. This is a descriptive, applied study which is based on the placement of one year with the Sourcing function of Atlas Copco (India) Pvt. Ltd., Pune from November 2025 to November 2026. The goals were to learn about sourcing, procurement and warehouse operations, to learn about SAP-based procurement, to get exposed to data validation and data cleansing, to explore supplier performance by monitoring lead time and checking adherence to delivery dates in an Excel-based Sourcing Dashboard, to participate in a Master Data Localization project and finally to bring up a conceptual, human-supervised, AI-based Sourcing Assistant. Evidence is through observation, participation, progress notes, mentor updates, supplier identities, commercial terms and performance figures are anonymised.**

There were five qualitative findings. Data validation was required before true analysis could be done; lead time and delivery adherence were tangible measures of supplier reliability; sourcing decisions were directly visible to the warehouse safety stock; localization was a staged process based on criteria and was not one decision; and regular tracking of purchase-orders led to repetitive manual efforts, which was the motivator for the Sourcing Assistant concept. The assistant is not built, piloted or tested and there are no promises of savings or localization outcomes. The study shows that good master data is the basis for monitoring suppliers, for localization and any subsequent digital support. It proposes periodic data validation, uniform localization screening, a tightly-focused and regulated trial of the assistant on low-value questions, and human judgement right along the way.

Keywords—Supply Chain Management, Master Data Localization, Supplier Performance Analytics, Procurement Optimization, Artificial Intelligence in Sourcing

I. INTRODUCTION

Global sourcing, warehousing and delivery networks rely on the performance of the networks of component and material suppliers, which is dependent on the coordination of sourcing, warehousing and delivery (Chopra & Meindl, 2016). Sourcing and procurement are amongst the first steps in this chain. Supplier selection, and the sourcing geography, can influence further downstream inventory buffers and delivery reliability as well as lead times. While global sourcing can provide access to specialised manufacturing, it can also involve longer lead times and increased exposure to logistics and currency risk, and is a topic that is revisited by manufacturers from time to time.

These decisions are based on facts. Material master, vendor master and purchase-order records are used as the foundation for all transactions and all reports created with these records, and missing or inconsistent records make it more difficult to evaluate suppliers and analyze sourcing. Validating master data is thus a prerequisite to monitoring supplier lead time and delivery date adherence as well as making Master Data Localization decisions, as described in this paper, which involves deciding whether a global sourced part can be sourced from suppliers in India. The use of digital tools, ranging from a simple spreadsheet with dashboards to newer AI-powered assistants has become a topic of discussion in trying to make this information more accessible; however, these tools are only as effective as the data that backs them.

This paper is based on a one year on-the-job training in the sourcing function (Category: CT) of Atlas Copco (India) Pvt. Ltd., Pune, a leading multinational company in the field of industrial equipment manufacturing. This includes the

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description of procurement data validation and cleansing, supplier monitoring and purchase-order monitoring using an Excel-based Sourcing Dashboard, and the involvement of a Master Data Localization project. It also describes the potential implementation of an AI-powered Sourcing Assistant, which hasn't been constructed or tested. The study is descriptive and applied: it describes work done and makes practical implications from it, rather than testing hypotheses or reporting on measured savings. The identity of suppliers, commercial terms and internal performance figures will not be revealed as required by the host organisation's confidentiality policy.

II. LITERATURE REVIEW AND THEORETICAL BACKGROUND

A. Literature Review

SCM considers materials, information and funds as moving between suppliers, manufacturers and customers and that sourcing is one of the decisions that influences the others (Chopra & Meindl, 2016). According to common purchasing literature, sourcing and procurement are essential parts of supply management, including supplier choice and how this process is managed and measured (Monczka et al., 2016; Van Weele, 2018). Many criteria other than price are now used to assess suppliers (Ho et al., 2010). Similarly, the approach to TCO adds to the price of the unit purchased (Ellram, 1995).

Performance measurement frameworks provide a collection of metrics and suggestions for selecting between the various frameworks (Beamon, 1999; Gunasekaran et al., 2001). Some operational measures that these frameworks contain include delivery reliability and delivery lead time. These measures rely on the records that they came from. Quality of data can be measured on many dimensions and is typically expressed as fitness for use (Wang & Strong, 1996). Poor master data is cited as a major cost of companies, and they need to consider the effort they put in to maintain master data and the cost of errors (Haug et al., 2011).

One approach to sourcing risk management is localization. Supply chain risk management reviews indicate that supply arrangements can be employed to minimize supply risk (Tang, 2006). A study of manufacturing site selection revealed that firms place greater consideration on the supply chain issues than cost (Ellram et al., 2013). The preceding study is a study of plant location and not component sourcing, so this is used here as a parallel.

From the digital perspective, there are generally considered to be two types of supply chain analytics: descriptive and predictive and prescriptive (Wang et al., 2016). These are classified as descriptive, and include a spreadsheet dashboard reporting lead time and delivery adherence (author's own classification). There are numerous factors that influence the digitisation of procurement (Bienhaus & Haddud, 2018) and research on the application of artificial intelligence in supply chain management has been carried out since at least Min (2010). The following literature can only be used as background. This is the author's idea for a new Sourcing Assistant, which has not been tested.

B. Theoretical Background

The study is based on the procure-to-pay logic – the requirement will be recorded as a purchase requisition, followed by a purchase order, goods receipt and payment. Work done for the internship was mostly completed in the first half of this cycle. Within SAP Materials Management, the material master and the vendor master are the reference records below the requisitions and orders; hence, the accuracy of their data is a limitation on the accuracy of any analysis that is based on them.

Supplier performance is assessed as both lead time and whether or not an order is delivered on time. Localisation is considered as a screening decision. Globally sourced parts are evaluated based on technical feasibility, their availability from local suppliers, lead time betterment, indicative cost competitiveness, and quality or certification alignment, in alignment with the principle of total cost of ownership.

There is a sense that digital capability is a progression from getting the records digitised, to having them integrated, to having them analysed, to AI-assisted support – and the Excel dashboard is in the first part of that, the proposed assistant is an early thought about the last. Such assistance is always human-in-the-loop; it gathers information and distributes reminders; supplier selection and negotiation remain part of the sourcing team.

III. MATERIALS AND METHODS

A. Research Objectives

The study was made to gain hands on experience in the SAP based sourcing and procurement process, data collection, validation and cleansing for sourcing analysis, understanding supplier performance and purchase order status by analyzing the supplier delivery performance in terms of lead time and delivery adherence through a structured Sourcing Dashboard, contributing to the Master Data Localisation project by conducting the screening of globally sourced parts for local sourcing potential, issuing RFQs and supporting the initial supplier discussions and conceptualising and defining the framework of an AI enabled Sourcing Assistant to monitor the supplier delivery performance, pending purchase orders and sourcing follow up and the related human oversight.

B. Research Design, Data and Methods

The study is descriptive applied and based on the participation of the author in Atlas Copco (India) Pvt. Ltd., Pune as a Sourcing Intern from November 2025 to November 2026 within the Sourcing function (Category: CT). It records the work performed and the lessons learnt from it – there were no hypotheses tested.

Primary data was gathered through observation during orientation and a visit to the warehouse, induction to SAP Materials Management (Purchase requisition, Purchase order, Vendor and Material master), exposure to dashboard development and industry localization project under the guidance of the industry mentor. Secondary data included the author's progress notes, mentor updates on progress made at regular intervals, non-confidential company and sector data, and literature reviewed. All the necessary data for procurement from the SAP system and internal data were harmonised,

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verified for missing, inconsistent and poorly formatted fields, and corrected in SAP where applicable. Supplier performance and purchase order status was analysed using lead time and delivery date adherence, and reported on a Microsoft Excel Sourcing Dashboard. Under Master Data Localization, parts sourced globally were shortlisted based on technical feasibility, the ability of the local supplier, the potential to reduce the lead-time, the indicative cost competitiveness and quality/certification alignment, and then approved by the mentor prior to issuing RFQs for local suppliers. The Sourcing Assistant concept was developed by using a comparison between the existing manual follow-up and the proposed follow-up.

Since it is not allowed to give supplier names, commercial terms or actual results under the non-disclosure conditions of the host organisation, no numerical results can be reported. The localization and Sourcing Assistant are based in part on periodic notes and recall for the earlier part of the placement. The author only got involved in the localization process up to the point where they consolidated the candidates, issued the RFQ, and provided support in the initial negotiations with the candidates; supplier selection was left to the sourcing team.

IV. DATA ANALYSIS AND DISCUSSION

Actual supplier names, prices and performance values are confidential, so this section presents the work qualitatively. It sets out what was done, what was produced, and what each activity showed. Where a table row is a proposal, it is marked as such.

A. Sourcing and Warehouse Exposure, and the Work Performed

TABLE I
ACTIVITIES, TOOLS AND OUTPUTS BY OBJECTIVE

Obj.	Activity performed (tool / source)	Output	Status
1	Orientation; warehouse visit; observation of the sourcing–inventory link (observation; mentor discussions)	Understanding of the sourcing-to-warehouse flow	Actual
2	SAP exposure; collection, validation and cleansing of procurement data (SAP MM; internal records)	Cleansed, validated procurement dataset	Actual
3	Supplier and purchase-order analysis; lead-time and delivery-date tracking (Microsoft Excel)	Sourcing Dashboard	Actual
4	Localization screening; RFQs; preliminary negotiation support (SAP master data; RFQ template; candidate tracker)	Candidate list; RFQ documentation; response tracking	Actual
5	AS-IS/TO-BE comparison; risk and oversight definition (concept document)	Conceptual proposal	Proposed (not built or piloted)

The fifth objective was still at the concept level, while the rest was at practical level as shown in Table I. The warehouse visit made it most evident why sourcing is important in the downstream. Items with longer supplier lead times were typically stocked at a higher level of safety-stock with those having shorter and more dependable lead times being stocked at a lower level of safety-stock. This was an observation, and a relationship that was not measured—this is the reason that lead time was selected as a key dashboard metric.

B. Data Validation and the Sourcing Dashboard

TABLE II
DATA-QUALITY DIMENSIONS ADDRESSED DURING VALIDATION

Dimension	Action taken	Example
Accuracy	Inaccurate entries corrected or flagged	Values checked against the authoritative SAP source, not assumed
Completeness	Incomplete records identified	Missing dates in order and delivery fields
Consistency	Inconsistent formatting standardised	Differing supplier naming conventions

Material identifiers, supplier references, order dates and delivery dates were present and valid, internally consistent and correctly formatted (Table II was checked for validation). These cleaned data then powered the supplier and purchase-order analysis that drove the dashboard—showing the performance of the supplier and delivery-date adherence. This sequence is important: Any dashboard number is limited in its reliability by the quality of the data underlying it. The point agrees with the perspective that data quality is fitness for use (Wang & Strong, 1996) and that bad master data costs money (Haug et al., 2011). The improvement is qualitatively described as the improved quality of input for sourcing analysis. This was not measured and the effect of the dashboard on team efficiency was not evaluated.

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C. Master Data Localization

TABLE III
LOCALIZATION WORKFLOW AND THE AUTHOR'S INVOLVEMENT

Stage	Activity	Status / limit
Review of master data	Globally sourced parts reviewed, with SAP as the primary reference	Actual
Feasibility screening	Five criteria applied: technical feasibility, local supplier capability, lead-time improvement, indicative cost competitiveness, quality/certification alignment	Actual
Candidate consolidation	List prepared and approved by the mentor before RFQs	Actual; count confidential
RFQ issuance	RFQs sent to Indian suppliers; responses tracked	Actual; counts confidential
Preliminary negotiation	Discussions with a subset of responding suppliers, under mentor guidance	Actual; outcomes confidential
Supplier selection, commercial finalisation, PO transition	Handled by the sourcing team	Outside the author's scope

Localization did not become a one-time decision, but rather a process (Table III). The key to each was a fully complete and comparable master-data view, which involved cross-referencing multiple SAP fields and records. The criteria reflect the total cost orientation in the literature (Ellram, 1995), in addition to lead time and quality. The benefits are expected, including a reduced time to market and exposure to international logistics and currency risk. The paper does not provide any localization results, and the final decisions were left to the sourcing team.

D. Proposed Sourcing Assistant

TABLE IV
OBSERVED PROCESS AND PROPOSED SOURCING ASSISTANT

Process	Current practice (observed)	Proposed (concept only)
PO status check	Manual filtering of the Excel dashboard or an SAP report	Natural-language query returning filtered results
Supplier delivery review	Compiled manually before each review meeting	Summary produced on demand from the same data
Meeting follow-up	Tracked manually by calendar and email	Reminders generated by the assistant

The gap behind the proposal was seen in the practice (Table IV). Despite the dashboard, the standard queries, such as what orders were to be expected from which supplier, had to be filtered manually every time. The proposed assistant would be restricted to data retrieval and reminders and use the approved data. Anything that impacts a supplier relationship or commercial term would remain in a human decision makers hands. The risks that were identified were: sensitive data exposure, misread queries, outdated data, and excessive use of the output from the tools. The assistant has not been tested as it was never built or piloted. Any benefit (e.g., fewer manual searches), is a working assumption, not a finding, for a pilot in the future.

V. FINDINGS, CONCLUSIONS AND SUGGESTIONS

A. Findings

Five findings were produced from the placement, all of them qualitative, observed and participatory, but not based on measures. First, the data quality was found to be a prerequisite for analysing the data: The procurement records had to be validated and cleaned before the results of supplier reporting or purchase-order reporting could be extracted. Errors in the procurement records, like missing dates or inconsistent supplier names, would then transfer directly to the results. Second, lead time and adherence to delivery dates were practical and readily measurable representation of supplier reliability and provided a workable foundation for the Sourcing Dashboard. Third, the visit at the warehouse revealed that the sourcing decision had to affect the inventory directly, as parts with longer supplier lead time were likely to be kept in higher safety stocks, whereas the ones with shorter more reliable supplier lead time were likely to be kept in lower safety stocks. Fourth, Master Data Localization was not a single decision, but a series of review, screening, consolidation of Master Data candidates, RFQ and preliminary negotiation processes, all based on a complete and comparable view of Master Data. As of this writing, the project was in its early stages of negotiations with a portion of the suppliers that responded. The project's final results were up to the discretion of the sourcing team. Finally, even with a dashboard, it was a manual process to track open and overdue purchase orders, which is why the Sourcing Assistant is being proposed. That support is merely a rationale, it hasn't been built, tested or piloted and the study provides no evidence of its effect.

B. Conclusions

This study aimed to capture the learning that took place in Atlas Copco (India) Pvt. Ltd. after a year of involvement in the sourcing function with the following five aims: The below are all practical objectives that were achieved: The author understood and gained practical experience of the connection between sourcing and warehouse availability, acquired working knowledge of SAP-based procurement, created and developed a dashboard around lead time and delivery compliance and participated in the early stages of a localization project. The fifth objective was only achieved at concept level in the form of a bounded framework for a Sourcing Assistant. The combination implies a sequence of dependency: Stable master data, then simple supplier measures, and if possible more advanced measures like localization screening or AI-assisted retrieval. Passing over the first step leaves all that follows in

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shambles. The reach of the study is limited. It is descriptive, it is placed in one position in one function and it does not report any measured results, therefore, it cannot demonstrate that localization reduces lead times or that the dashboard or assistant saves effort. It provides a practical description of the way these tasks fit together and where some careful and human-supervised support to the digital realm may lie next, this is a test for the sourcing team and not for this paper.

C. Suggestions

Based on these results, a step-by-step and gradual plan is recommended.

For Sourcing and Procurement: Schedule a recurring monthly data validation for procurement (and/or have a named owner); Make lead time and adherence to delivery dates the primary measures in the dashboard; and use the same localization criteria for future candidates.

For Suppliers: make sure that promised delivery dates and answers to RFQs are confirmed in a standard format for ease of tracking and comparison.

For Warehouse and Inventory: Check safety-stock with supplier lead-time records.

For Management and IT/Data Teams: Define rules for accessing data and scope of queries before allowing assistants to access live SAP data, and then test this initially with pending-purchase-order queries on one category.

For all users: maintain supplier selection, negotiation and localization with sourcing team and the assistant should only get information and send reminders.

D. Implications of the Study

The findings have implications for several groups, none of which has been proven to benefit.

Sourcing & Procurement Teams: A solid master data database and a consistent set of supplier measures provide a more solid foundation for supplier review and follow-up; this is not reflected in the study as it represents a time saving.

Suppliers: A documented localization process, based on criteria, might provide a better path for qualified Indian suppliers to qualify, and all suppliers can be assured that deliveries will be tracked against promised dates.

Warehouse / Inventory Teams: Better visibility of the supplier leads time may be a factor in safety stock decisions, but not measured.

AI-assisted tools and localization also seem to rely on data governance as their basis, and human oversight needs to be agreed on prior to broader use. In addition, no savings are presented.

IT and Data Teams: An Assistant would require access controls and a data-refresh process and a relatively limited scope (which would have to be outlined).

E. to explore the future scope of the study.E. Future scope of the study.

There are several directions left for future work, none yet undertaken.

Pilot Testing: An implementation pilot with some specific testing of the Sourcing Assistant on pending-purchase-order queries might be able to test accuracy, usability and effort saved, with human review and data-access governance in place.

Dashboard Expansion: When lead time and delivery adherence are well integrated, other metrics like supplier responsiveness, quality incidents or order ageing could be included; later on, if there is a need to share or need to deal with a lot of data, a tool like Power BI could be included.

Supplier-Performance Analytics: When sufficient information is accumulated, formal time series analysis may be able to differentiate between the sustained trends in lead time and delivery adherence and the normal variation.

Localization Assessment – Parts sourced locally could be reviewed regularly in terms of the criteria, and parts sourced globally could be tracked over time, in order to understand the impact on lead-time and cost.

Data-Quality Monitoring: Completeness, consistency and validity rates could be monitored routinely to determine if data quality is being maintained.

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