

Backup Supplier Independence and Procurement Resilience in Small Enterprises

Ulfa Yuniati¹ | Cucu Sugyati²

1. Universitas Muhammadiyah Bandung | ulfa.yuniati@gmail.com

2. PELITA NUSA BANDUNG BARAT; STIMIK Mardira Bandung | Sugyaticucu@gmail.com

Abstract

A list of alternative suppliers may provide limited protection when every supplier depends on the same upstream source or logistics route. This conceptual article develops a framework for evaluating backups through disruption-specific independence, substitution readiness, and the cost of maintaining alternatives. Selected supply-network literature supplies a contextual foundation; operational definitions and propositions are developed through scenario reasoning. No enterprise data, disruption probabilities, simulation results, or measured resilience gains are reported. The framework separates the number of suppliers from shared exposure and distinguishes a nominal alternative from one capable of supplying accepted quality within the time available. A hypothetical food-enterprise example illustrates why an alternative may cover a supplier-specific vehicle failure while remaining ineffective against closure of a shared warehouse. The article proposes a dependency matrix, a readiness checklist, controlled trial orders, and outcome measures for prospective validation. Three propositions connect common exposure to backup value, prior trials to switching delay, and buffer inventory to the usefulness of slower independent suppliers. The contribution is a testable decision framework that combines network reasoning with practical procurement records. Application requires verification of upstream information, sector-specific quality assessment, and explicit evaluation of coordination, inventory, and confidentiality costs.

Keywords: backup suppliers; procurement; shared risk; small enterprises; supply resilience; switching readiness.

1. Introduction

Three supplier contacts do not necessarily provide three independent supply paths. They may purchase from one distributor, rely on the same road, or operate within one vulnerable production location. The relevant question is which disruptions an alternative can actually cover. The framework treats resilience as maintaining a viable minimum supply during a defined disruption, subject to quality, timing, and cost constraints.

2. Conceptual approach and network perspective

The article uses scenario-based conceptual analysis. It links the source of a disruption to dependencies, available alternatives, and the enterprise's switching decision. The analytical unit is a critical input under a specified disruption scenario. Supplier counts are retained as descriptive information, but do not substitute for evidence about supply-path differences.

Ivanov and Dolgui (2020) provide a network-level perspective through the concept of intertwined supply networks. The source motivates attention to connections beyond the immediate supplier. It does not establish the upstream relationships of any supplier in this article. The proposed matrix and trial-order procedure are practical conceptual extensions for small enterprises, rather than validated applications of that paper.

OECD (2021) supplies context for SME digitalisation. Digital records may make dependencies and trials easier to document, but the analysis does not assume that adopting an application creates physical supply independence. Source selection is purposive, with no systematic search, interviews, probability model, or computational experiment.

The reasoning distinguishes exposure from response capacity. A backup may avoid one common risk while lacking accepted quality or delivery speed. Conversely, a ready supplier may share the very upstream point that the enterprise seeks to protect against. These dimensions should be examined separately before they are combined into a managerial judgement.

Analytical dimension	Main question	Evidence needed
Common exposure	Can one event disable both suppliers?	Verified sources and routes
Substitution readiness	Can the alternative supply usable material?	Quality, quantity, and lead-time checks
Switching process	Can the enterprise activate the alternative?	Ordering, approval, and payment readiness
Economic feasibility	Is the backup affordable to maintain?	Trial, coordination, and inventory costs

The framework therefore defines a backup relationally: it is an alternative for an identified input and disruption, under stated service requirements. Calling a supplier generally safe obscures the conditions that make its protection useful.

3. Identifying critical inputs and minimum service

The first step is to identify the inputs whose absence would prevent the enterprise from maintaining essential activity. Criticality depends on function, substitutability, and the time until operations are affected. An easily available packaging item and a specialised component requiring qualification should not receive identical backup arrangements.

Minimum service specifies the quantity and quality needed during a disruption. It may be lower than normal production volume, but must be sufficient for the enterprise's chosen continuity objective. A backup capable of a small trial order cannot automatically be assumed capable of meeting full peak demand.

The enterprise should record current consumption, usable stock, accepted substitutes, and the consequences of interruption. Stock should be measured in usable units, excluding damaged or expired items. For perishable inputs, time coverage depends on both consumption and shelf life. A large physical stock can provide little protection if it will expire before use.

Criticality also changes with product mix. A promotion may increase dependence on one ingredient or component that is normally unimportant. Review should therefore be triggered by a material change in production, supplier structure, or customer commitments, rather than conducted only at a fixed annual date.

Input profile	Continuity concern	Appropriate first check
Standard commodity	Availability and delivery timing	Local alternatives and route exposure
Perishable material	Short shelf life and daily replenishment	Usable stock and accepted quality
Specialised component	Qualification and tooling delay	Technical compatibility and approval
Customer-specific material	Contractual specification	Permission for substitution

The framework does not prescribe diversifying every purchase. Limited managerial time should be directed towards inputs with meaningful operational consequences. Overextending the supplier list may increase quality variation and coordination cost without protecting the enterprise's actual bottleneck. The decision record should explain why an input is included and which service objective the backup is intended to preserve.

4. Mapping common dependencies

A dependency matrix links active and alternative suppliers to upstream material sources, production locations, distributors, transport routes, and other relevant infrastructure. It records confirmed links, plausible links requiring verification, and unknown links separately. An unknown source is not evidence of independence.

Information should be obtained through legitimate commercial communication or public records where appropriate. Suppliers may reasonably protect confidential relationships. The enterprise can request evidence at a level sufficient to assess common exposure without demanding unnecessary customer lists or proprietary production details.

Shared exposure is scenario-specific. Two suppliers using the same road may still cover a failure of one supplier's vehicle. The same pair may offer little protection against closure of that road. A supplier located elsewhere may avoid a regional outage but depend on the same upstream warehouse. Independence must therefore be stated against a named event.

A simple matrix can be more transparent than a composite score. Adding uncertain dimensions into one number risks implying that strong performance on one attribute compensates for a fatal dependency on another. The framework recommends first identifying the shared points capable of disabling all acceptable alternatives.

Dependency field	Possible common point	Verification question
Upstream material	Same producer or warehouse	Are sources genuinely distinct?
Production location	Same industrial area	Would a local disruption affect both?
Distribution	Same intermediary	Is stock held independently?
Transport	Same vulnerable route	Is a feasible alternative route available?
Information status	Undisclosed or outdated link	When and how was it checked?

The matrix requires updating because sourcing arrangements can change. Each statement should retain a date, information source, and responsible recorder. The purpose is not to label suppliers permanently, but to make the current backup decision's assumptions visible. A matrix whose last verification is unknown cannot support a confident statement about current network exposure.

5. Readiness to substitute suppliers

Independence is insufficient unless the backup can provide accepted material before existing stock is exhausted. Readiness includes technical quality, available quantity, lead time, commercial terms, and the enterprise's own approval process. A supplier with stock but unsuitable specifications does not provide a usable alternative.

Quality assessment should precede emergency use where feasible. Samples, accepted test batches, or recognised specifications can reduce uncertainty. However, a successful small trial does not prove future consistency or capacity under widespread disruption. Readiness records should state what was tested, when, at what quantity, and under which operating conditions.

Lead time should include ordering, production, dispatch, transport, inspection, and release for use. Counting only transport time understates the interval before operations can resume. Payment setup and internal approval can also delay activation even when the supplier is physically ready.

The enterprise's switching procedure matters. Staff need access to the alternative's details, the permitted specification, and the authority to place an order. A contact number stored only on one employee's phone can become an organisational bottleneck. The framework proposes documenting the minimum information needed to activate the backup, without distributing unnecessary commercial data.

Readiness dimension	Evidence	Failure mode if omitted
Quality	Accepted sample or specification check	Unusable delivery
Quantity	Confirmed capacity for the required window	Insufficient supply
Full lead time	Order-to-usable-material record	Stock exhausted before substitution
Commercial setup	Agreed terms and payment readiness	Administrative delay
Internal activation	Responsible person and authority	Decision stalled during disruption

Readiness should be classified as verified, partially verified, or untested. This avoids treating confidence as a binary property. The enterprise can then choose whether to accept residual uncertainty, conduct a trial, maintain more buffer stock, or redesign the input requirement before relying on the alternative.

6. Hypothetical supplier scenario

Consider a food enterprise with active supplier A and backup supplier B. Both obtain a critical ingredient from warehouse W. Supplier C obtains the ingredient from a separate source but requires a longer lead time. These relationships are hypothetical and are not descriptions of identifiable enterprises.

If A's vehicle fails while W remains operational, B may maintain supply through its own transport. If W closes, both A and B may become unavailable. C may cover the warehouse event, but only if its material meets the required specification and existing usable inventory can bridge the additional wait.

Hypothetical disruption	Supplier B	Supplier C
A's vehicle unavailable	Potentially useful if own transport is ready	Potentially useful, subject to lead time
Shared warehouse W unavailable	Exposed to the same event	Potentially independent of W
Ingredient specification changes	Requires renewed quality check	Requires renewed quality check
Demand exceeds trial quantity	Capacity not established by contact list	Capacity not established by source difference

This scenario shows why a backup's status is conditional. B is neither universally ineffective nor universally resilient. It covers a supplier-specific transport event but not the stated warehouse event. C's different source addresses one dependency while introducing a timing constraint.

Combining C with buffer inventory can change the decision. More inventory may cover its longer wait, but adds storage, working-capital, deterioration, and handling costs. For perishable material, simply increasing stock may not be feasible. The enterprise must compare the backup arrangement with operational redesign, alternative product mix, or temporary reductions in service.

No disruption probability or optimal inventory quantity is inferred from the scenario. Those parameters require observed consumption, supplier performance, quality results, and credible information about the relevant exposure. The illustration establishes how the variables interact, rather than predicting which real supplier a business should select.

7. Cost trade-offs and controlled trial orders

An active backup relationship can be maintained through small periodic orders. These orders test communication, payment, delivery, inspection, and documentation before an emergency. Their value depends on whether the test resembles the capacity and conditions that matter to the continuity objective.

Maintaining alternatives has costs. Unit prices may be higher, volume discounts from the active supplier may fall, and inspection or administration may increase. Buffer inventory ties up cash and may deteriorate. The framework therefore compares the cost of preparedness with the operational consequences that the arrangement can plausibly avoid, without assuming that more backups are always better.

A trial order should have a stated objective, accepted quality criteria, expected lead time, maximum expenditure, and responsible reviewer. Completion records distinguish technical acceptance from successful procurement administration. A delivered sample with no usable invoice or payment route may leave an important switching problem unresolved.

The trial must not create deliberate harmful disruption. Routine small orders or agreed exercises can reveal readiness without withholding essential material from customers or partners. Results should be described as trial performance, not as proof of behaviour during a future regional shock.

Preparedness cost	What it buys	What still requires assessment
Trial orders	Tested transaction route	Capacity during broad disruption
Additional inspection	Knowledge of input compatibility	Consistency across later batches
Buffer inventory	Time to activate a slower source	Shelf life and working-capital cost
Multiple commercial setups	Faster administrative switching	Ongoing coordination burden

A decision record should explain the selected arrangement's coverage, residual exposure, cost, and review trigger. This makes it possible to assess whether the enterprise is paying for protection against the right bottleneck. It also supports learning when a trial fails: the problem may concern quality, timing, capacity, or internal administration rather than a general lack of supplier reliability.

8. Propositions and outcome measures

Proposition 1 states that the continuity benefit of adding suppliers decreases when they share the dominant source of disruption. The prediction concerns common exposure, not the number of names itself. A study should distinguish supplier-specific events from shared-network events before relating supplier counts to continuity outcomes.

Proposition 2 states that prior relevant trial orders will be associated with shorter switching delay, conditional on current capacity and quality. The mechanism may involve documentation, payment readiness, or accepted specifications. Measuring these intermediate conditions helps avoid crediting trial orders for benefits actually caused by larger resources or stronger management.

Proposition 3 states that usable buffer stock increases the value of independent suppliers with longer lead times, within shelf-life and financing constraints. Excess inventory may increase loss and reduce financial resilience. The proposition therefore does not imply an unlimited positive relationship between inventory and continuity.

Proposed outcome	Definition	Important qualification
Switching delay	Time from activation decision to usable receipt	Include inspection and internal approval
Minimum service maintained	Output meeting the stated continuity target	Define target before event
Common exposure	Verified dependency shared across alternatives	Separate unknown information
Preparedness cost	Trial, coordination, inventory, and inspection cost	Include recurring effort
Quality failure	Delivery not accepted for intended use	Record specification and reason

The absence of a disruption during observation does not establish that a backup worked. It may leave the continuity outcome unobserved. Studies should report this limitation and use controlled trials only for the readiness dimensions they can actually test. No numerical effect, probability, or statistical significance is asserted in the present article.

9. Prospective validation and implementation limits

A prospective study can follow critical-input records across enterprises and document active suppliers, alternatives, dependency evidence, trials, and actual interruptions. Events should be classified using a pre-specified scheme. An observed delay at the focal supplier may originate upstream, so event attribution needs more than the supplier's name.

The design should compare similar inputs where feasible and account for enterprise size, purchase volume, sector, perishability, and access to logistics. Enterprises with stronger resources may maintain backups and recover faster for unrelated reasons. Observational associations should not be presented as causal effects without adequate design and assumptions.

Implementation begins with one critical input and a few plausible disruptions. The enterprise verifies what it can, marks what remains unknown, and conducts proportionate readiness checks. Expansion follows only when the record can be maintained reliably. Digital tools can organise the matrix; they cannot establish a dependency that nobody has verified.

Validation stage	Data to collect	What it can support
Dependency mapping	Dated source and route evidence	Current exposure description
Trial order	Quantity, quality, lead time, cost	Tested readiness at stated scale
Actual event	Cause, switching action, service outcome	Observed disruption response
Follow-up review	Updated links and cost burden	Continued relevance of arrangement

Confidential commercial information should be collected minimally and accessed proportionately. Networks change, and suppliers may lack complete information about their own upstream dependencies. The framework also omits a comprehensive risk-probability model and does not derive an optimal sourcing portfolio. Its usefulness must be evaluated against verification costs and the possibility that operational redesign is more effective than adding a supplier.

10. Conclusion and conceptual contribution

A backup supplier should be evaluated through the disruption it can cover, its common dependencies with the active supplier, and its ability to deliver usable material within the available time. A supplier count alone leaves these conditions unresolved. The hypothetical example demonstrates why one alternative can cover a vehicle problem while failing against a shared warehouse closure.

The conceptual contribution separates network independence, substitution readiness, and economic feasibility. This distinction connects supply-network reasoning with records that a small enterprise can potentially maintain. It also identifies where evidence is missing, so that uncertainty is not silently converted into an assurance of resilience.

The practical contribution includes a dependency matrix, minimum-service definition, readiness checklist, trial-order record, and prospective outcome measures. These tools are proposed for validation. They do not establish that a supplier is safe, that a particular inventory level is optimal, or that preparedness expenditure will always be justified.

Further work should investigate sector differences, information availability, the scale of trial orders, and the cost of maintaining alternatives. Actual disruption observations are needed to examine continuity claims. Studies should report both benefits and failures, including quality problems and financing pressure created by excessive inventory. Application in West Java must be grounded in verified procurement information and the enterprise's own continuity objective.

References

Ivanov, D., & Dolgui, A. (2020). Viability of intertwined supply networks: Extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak. *International Journal of Production Research*, 58(10), 2904-2915. <https://doi.org/10.1080/00207543.2020.1750727>

OECD. (2021). *The Digital Transformation of SMEs*. OECD Publishing. <https://doi.org/10.1787/bdb9256a-en>