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Why Ecosystem Access Fails: MSME Resource Conversion in Eastern Indonesia

Jacline I. Sumual*, George Kawung, and Mauna Th.B. Maramis

Faculty of Economics and Business, Universitas Sam Ratulangi, Manado, 95115, Indonesia

ABSTRACT

Purpose – Ecosystem programs widen access to training, finance, networks, and digital tools, but access does not explain how a resource enters daily work. This study examines resource conversion and where it stalls or changes path.
Design/methodology/approach – The study used an abductive comparative multiple-case design. Fourteen MSMEs were screened and 13 cases from four provinces were retained. The evidence includes 35 interviews with owners, employees, partners, and ecosystem actors, totaling 34 hours and 43 minutes. Analysis combined case chronologies, incident coding, cross-case matrices, and negative-case checks.
Findings/Results – Sustained conversion involved local translation and recombination, a delegated trial, and routine embedding. Informal networks sometimes offered another entry. Owner bottlenecks, low operational slack, poor task-technology fit, and fragmented support were associated with stalled or symbolic use. The fragile case showed that a working system may still fail when knowledge and authority remain concentrated.
Originality/Value – Resource conversion is defined as the bounded work between access and a repeatable routine. It excludes acquisition, broad strategic reconfiguration, and firm performance itself. The model distinguishes core, alternative, failure, fragile, recovery, and feedback movements.

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*Corresponding Author at: jacline_sumual@unsrat.ac.id
Department of Economics, Faculty of Economics and Business, Universitas Sam Ratulangi, Manado 95115, Indonesia.
E-mail address: jacline_sumual@unsrat.ac.id (Jacline I. Sumual)
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1. Introduction

Entrepreneurial ecosystems can make finance, knowledge, networks, and infrastructure easier for small firms to reach. That is their promise. The harder question begins after access is granted. Program reports often count participants, equipment, or institutional links, but entrepreneurship unfolds through interdependent actors and territorial conditions (Stam & van de Ven, 2021; Wurth et al., 2022). Those reports rarely show what happens when an owner returns to the shop and finds that the new tool does not fit the work already under way.

The gap between access and use is especially visible in MSMEs. In one day, an owner may handle production, purchasing, finance, staffing, and customer complaints. Employees often learn from one another rather than from manuals. In this setting, a useful tool can remain idle. A machine may need more electricity than the workshop can provide. An online store may attract orders that the firm cannot deliver. A cashier application may be slower than the notebook it is meant to replace. The issue is not access alone, but the work needed to interpret, adapt, combine, and stabilize an outside input.

Process-oriented ecosystem research has started to focus on sequences, mechanisms, and feedback rather than only on ecosystem elements (Spigel & Harrison, 2018; Wurth et al., 2023). Resource orchestration makes a related point through the structuring, bundling, and leveraging of resources (Sirmon et al., 2011). Knowledge integration adds a coordination problem, because technical advice has to make sense to people with different experience and vocabulary (Grant, 1996). Even so, the ordinary work between receiving support and changing a routine is still not described very well.

Digitalization research faces the same problem. Installing a platform, device, or application does not by itself transform a process (Li et al., 2018; Plekhanov et al., 2023). Strategy, skills, learning, and capability still matter (Eller et al., 2020; Garzoni et al., 2020; Kahveci, 2025). Recent MSME studies also suggest that gains from digital marketing and transactions depend on continuing human and organizational capability, not only on technology ownership (Dwiputri et al., 2026; Wibowo et al., 2026). What remains less clear is how workers with different skills, connectivity, and available time keep a routine going after formal support has ended.

These frictions are easier to see in geographically fragmented settings. A digital order still depends on electricity, packaging, transport, storage, repair services, and trust. Studies in rural settings show that digital and non-digital tools are often used together, while community learning helps new practices endure (Sommer et al., 2025). Social networks can also carry knowledge and support innovation when formal resources are incomplete (Do et al., 2026; Vu et al., 2023). Infrastructure is not one thing. Its value depends on how well it fits the routine and whether local actors can build an alternative when the formal system fails.

The question is straightforward: How and why do MSMEs differ in converting accessible ecosystem resources into adaptive business outcomes, and what roles do infrastructure and local relationships play? We address it through an abductive comparison of 13 MSMEs in South Sulawesi, North Sulawesi, Maluku, and East Nusa Tenggara, together with interviews involving universities, government, finance, distributors, digital platforms, and community actors.

The contribution lies in the passage between access and capability. We use resource conversion for the bounded work through which one accessible external input becomes a routine that can be repeated beyond the original translator, provider, or device. It does not cover resource search, broad strategic reconfiguration, or firm performance itself. Three empirical tests matter

in the cases: the input becomes understandable in local work, someone has room and authority to try it, and the practice can continue after the first effort. Adaptive operational change is a proximal outcome. Renewed access is a later and less certain feedback. The cases also show an informal entry path and a fragile path in which apparent success does not survive an outage.

2. Theoretical Review

2.1. From Ecosystem Resources to Resource Conversion

Entrepreneurial ecosystems are a set of interdependent actors, resources and institutional conditions that facilitate and hinder entrepreneurial activity in a territory (Stam & van de Ven, 2021). This systems perspective recognizes that ventures rely on universities, public agencies, financial institutions, customers, suppliers, professional services, and social networks. A structural ecosystem perspective also emphasizes the coordination of actors, activities, positions and flows required to make a value proposition come to fruition (Adner, 2017). For MSMEs, however, the existence of these elements does not ensure that a resource is reachable, relevant, or implementable.

Mechanism-oriented ecosystem research separates inputs, outputs, outcomes, and feedback processes (Wurth et al., 2023). This matters because programs can increase a firm's contact with ecosystem actors without changing its capacity to act. A process view also suggests that resources move through sequences and relationships rather than along a simple path from support to performance (Spigel & Harrison, 2018). The analytical question is therefore not only whether an MSME has received training, equipment, finance, or digital access, but what organizational work turns that access into a regular practice.

Resource orchestration is a useful starting point. Firms add value by organizing their resource portfolio, bundling resources into capabilities, and using those capabilities in particular opportunities (Sirmon et al., 2011). The process in a microenterprise is often less orderly. Owners may not have specialists, employees may resist unfamiliar procedures, and outside technologies may not fit local work rhythms. Here, conversion is treated as a negotiated and situated process that includes activation, translation, selective recombination, testing, and incorporation into an operational routine.

2.2. Knowledge Integration and Digital Process Change

Knowledge integration helps explain why the same training or technology can lead to different results. Organizational capability depends on combining specialized knowledge even when people do not hold the same expertise (Grant, 1996). In a small firm, this may happen through simple rules, task sequencing, shared artifacts, or a person who translates between technical language and production experience. This is different from merely acquiring knowledge. An owner may understand a workshop concept but still be unable to provide the time, authority, or responsibility needed to apply it.

Digital transformation research also distinguishes technology adoption from organizational change. SME entrepreneurs need room to interpret opportunities, learn by trying, and adjust existing practices (Li et al., 2018; Matarazzo et al., 2021). This is consistent with dynamic-capability theory, which sees adaptation in sensing, seizing, and transforming resource bases rather than in technology ownership alone (Teece, 2007). Digital innovation hubs and other intermediaries can serve as knowledge brokers, but their value depends on continued translation and interaction with the receiving firm (Crupi et al., 2020). Four-level and cyclical models of digital transformation likewise place implementation and continuous improvement after awareness and initial adoption (Garzoni et al., 2020; Kahveci, 2025).

In this study, digital process change means a change in how interdependent activities such as inventory, production, payment, order fulfillment, logistics, or customer response are coordinated. This is narrower than general digital presence. Evidence that digitalization can support product and process innovation does not mean that every digital tool will do so; outcomes still depend on internal skills, strategic direction, and capability reconfiguration (Eller et al., 2020; Radicic & Petković, 2023; Xie et al., 2022). A social-media account may increase visibility without changing the inventory or fulfillment system behind it.

2.3. Infrastructure Complementarity and Peripheral Adaptation

Digital affordances can diminish spatial limitations, but they cannot replace the material and relational basis of economic activity (Autio et al., 2018). Products, packaging, electricity, payment confirmation, transport and delivery are still required for orders. Infrastructure is therefore conceptualized as a complementary implementation condition. It can validate and speed up a process designed by the firm, or it can interrupt a process when devices, connectivity, energy, maintenance and logistics do not match the process.

Research on rural digital innovation often points to hybrid arrangements. Using digital and non-digital tools together can lower barriers to participation, while community engagement and collective learning help new practices become established (Sommer et al., 2025). A manual card, paper ledger, or local transport relationship should not automatically be treated as a sign of backwardness. It may be the practical interface that allows a digital process to work under uneven infrastructure.

Social capital and entrepreneurial bricolage also help explain how firms respond when formal resources are missing. Networks can provide information, trust, feedback, labor, and market links, while knowledge combination helps turn those relationships into innovation (Do et al., 2026; Vu et al., 2023). Bricolage refers to the creative use of resources at hand under constraint (Baker & Nelson, 2005) and has been linked to several forms of MSME innovation in a developing economy (Flaminiano, 2024). These ideas keep the analysis open to both formal ecosystem support and locally built substitutes.

Across the four provinces, these conditions appeared in different combinations rather than as one uniform regional deficit. Inter-island movement and thin logistics made delivery schedules part of production planning. Uneven electricity, connectivity, repair access, and spare parts increased the value of offline and manual fallback. Limited follow-up capacity made program hand-offs more fragile. At the same time, family and community ties often carried information, trust, deferred payment, and last-mile transport. The context did not create a separate conversion process. It changed which mechanisms became urgent and which local substitutes were available.

2.4. Resource Conversion as a Distinct Organizational Process

Resource conversion refers here to the situated organizational work through which a reachable external input becomes a repeatable operating routine. The idea is deliberately narrow. It begins after a resource is accessible and ends when the practice can continue without the original provider or champion. Resource search, acquisition, broad strategic sensing, portfolio-level bundling, and final firm performance sit outside the construct. The practical questions are smaller: who makes the input understandable, who is allowed to test it, and what keeps the new practice running after the first effort?

This focus places resource conversion beside several established concepts without replacing them. Resource orchestration explains how managers structure, bundle, and leverage a portfolio (Sirmon et al., 2011). Knowledge integration and absorptive capacity explain how

external knowledge is recognized, assimilated, combined, and used (Cohen & Levinthal, 1990; Grant, 1996; Zahra & George, 2002). Dynamic capabilities concern broader sensing, seizing, and transformation (Teece, 2007). Bricolage explains how actors make do with resources at hand (Baker & Nelson, 2005). Implementation research draws attention to fit, commitment, and the setting in which an innovation is introduced (Klein & Sorra, 1996). Resource conversion does not gather all of these processes under a new name. It isolates the narrower passage from a reachable input to a routine that is workable, shared, and able to continue.

Table 1. Resource Conversion and Adjacent Concepts

Concept	Main focus	Boundary with resource conversion
Resource orchestration	Structuring, bundling, and leveraging a resource portfolio.	Portfolio structuring and opportunity-level leveraging remain outside the construct. Conversion follows one external input until it becomes a shared routine.
Knowledge integration	Coordinating specialized knowledge held by different people.	Knowledge may be coordinated but still stay outside the workflow. Conversion requires a task, artifact, and repeatable work rule.
Absorptive capacity	Recognizing, assimilating, transforming, and exploiting external knowledge.	Acquisition and assimilation alone are outside the construct. Conversion focuses on whether a reachable input becomes executable in daily work.
Dynamic capabilities	Higher-order sensing, seizing, and transformation for adaptation.	Strategic sensing and broad reconfiguration are outside its scope. Conversion concerns lower-level implementation that may later support capability.
Bricolage	Recombining resources at hand under constraint.	Improvisation is not conversion if it stays temporary or personal. It enters the construct when the solution becomes stable and shared.
Innovation implementation	Fit, commitment, and implementation climate around an innovation.	Initial adoption is not enough. Conversion includes ecosystem entry and continuity beyond the provider, champion, or device.

Source: Authors' analysis, 2026.

The model therefore separates mechanisms, conditions, and outcomes. Relational translation and delegated experimentation are mechanisms. Selective recombination often occurs inside both. Hybrid routine embedding is the mechanism through which a trial becomes repeatable. Adaptive operational change is a proximal outcome, not another stage. Renewed access is a possible feedback outcome. The distinction is also empirical. A firm may learn without conversion when knowledge stays in the owner's head. It may improvise without conversion when the workaround remains personal or temporary. It may adopt a tool without conversion when the workflow stops as soon as the facilitator, owner, or main device is absent. In this

dataset, sustained conversion was not found without a workable local translation, some room to try, and continuity beyond the first translator.

3. Methodology

3.1. Research Design

An abductive comparative multiple-case design was used because the cases did not follow one fixed sequence. They showed different interruptions, adjustments, and feedback. The analysis moved back and forth between field episodes and theoretical concepts (Dubois & Gadde, 2002). The comparison included firms that received similar support but reached different outcomes, as well as firms that adapted despite limited formal support.

Each case consisted of an MSME and the sequence through which it tried to use an external resource. The organization was the unit of analysis. Owners, employees, operating partners, and ecosystem actors offered different views of the same process. The labels successful converter, access-trapped firm, resourceful adapter, constrained firm, and fragile converter remained provisional until the cross-case comparison was completed.

The design focused on concrete episodes, decisions, and turning points rather than on the frequency of a theme. This made it possible to compare how similar forms of support moved through different organizational settings and why some attempts became routines while others stopped early.

3.2. Case Selection and Informants

Cases were selected purposively and contrastively. The audited screening pool contained 14 MSMEs drawn from the three interview sets. A short form recorded the support received, the presence of an identifiable conversion episode, operational change, division of digital work, infrastructure constraints, and recent outcomes. The screening was qualitative. It did not use survey scores. One Surabaya firm was retained in the audit trail as an external contrast, but it was removed from the core analysis because it fell outside the study's Eastern Indonesian boundary. The final analytical sample therefore contained 13 MSMEs.

The initial comparison covered four patterns: support with sustained conversion, support with weak conversion, limited formal support with strong adaptation, and low access with weak conversion. A fifth configuration emerged during analysis. In the fragile-converter case, a digital routine appeared to work until a network outage exposed how much knowledge and authority still rested with one person and one device. The final sample included three successful converters, three access-trapped firms, three resourceful adapters, three constrained firms, and one fragile converter across South Sulawesi, North Sulawesi, Maluku, and East Nusa Tenggara.

The evidence comprises 35 interviews: 25 linked directly to the 13 MSME cases and 10 with ecosystem actors. Together, they lasted 2,083 minutes, or 34 hours and 43 minutes. Ten MSME cases had more than one case-linked account and formed the main basis for within-case comparison. Three single-informant cases were kept as supplementary replications because each added a clear contrast. We do not claim theoretical saturation. Fieldwork stopped when the planned contrast set was complete. Analytical sufficiency was judged later, from repeated mechanisms across cases and roles and from the capacity of negative cases to change the explanation. The fragile case did exactly that. It added a boundary condition rather than being forced into a success-or-failure category.

Thirteen cases were not treated as sufficient because of the number alone. The basis was replication. The successful converters repeated the core mechanisms across different sectors

and provinces. Access-trapped and constrained firms showed where the process stopped. Resourceful adapters showed that formal support was not the only entry. FC1 then changed the model by exposing fragile embedding. Similar mechanisms also appeared in owner, employee, partner, and ecosystem accounts. This combination of repeated patterns, deliberate contrasts, and a deviant case supports analytical transfer to settings with comparable implementation conditions. It does not establish how common any pathway is.

Table 2. Case Configuration and Sample Composition

Case	Configuration	Province	Sector	Case-linked interviews	Central contrast
SC1	Successful converter	South Sulawesi	Seafood processing	2	Manual recording → offline digital inventory → delegated continuity
SC2	Successful converter	North Sulawesi	Spice processing	3	Physical board → staff translator → cloud inventory → market credibility
SC3	Successful converter	East Nusa Tenggara	Coffee agribusiness	1	Technical measurement translated into color-coded production rules
AT1	Access-trapped	Maluku	Sago-fibre crafts	2	Training understood, but logistics, formalization, and time blocked implementation
AT2	Access-trapped	North Sulawesi	Coconut-fibre and wood crafts	2	Equipment and digital sales disconnected from power capacity and delegation
AT3	Access-trapped	Maluku	Processed food	2	Real-time digital cashier system conflicted with connectivity and transaction speed
RA1	Resourceful adapter	East Nusa Tenggara	Seaweed products	1	Online learning, local substitution, repeated trials, later formal recognition
RA2	Resourceful adapter	North Sulawesi	Fish processing	3	Community supply, customer feedback, and informal logistics feeder network
RA3	Resourceful adapter	East Nusa Tenggara	Fashion	2	Physical warehouse reconfiguration before digital recording
CF1	Constrained firm	Maluku	Salted fish	1	Equipment, packaging, repair, and transport conditions made conversion infeasible

Case	Configuration	Province	Sector	Case-linked interviews	Central contrast
CF2	Constrained firm	North Sulawesi	Palm sugar	2	Low literacy, weak infrastructure, liquidity pressure, and collector dependency
CF3	Constrained firm	East Nusa Tenggara	Rattan crafts	2	Limited maintenance, learning time, and market alternatives
FC1	Fragile converter	North Sulawesi	Local logistics	2	Digital efficiency without distributed route knowledge or outage authority

Source: Authors' analysis, 2026

Table 3. Interview and Data Composition

Data source	n	Primary analytical contribution
MSME owners/managers	13	Access episodes, decisions, experiments, outcomes
Employees/internal operators and case partners	12	Execution, knowledge distribution, routine continuity, contradictions
University/incubator actors	3	Program design, translation, and post-program support
Government actors	2	Administrative targets, equipment distribution, and coordination
Financial and distribution actors	3	Credit assessment, credibility, contracts, and market access
Platform/logistics and community actors	2	Physical-digital infrastructure and informal feeder arrangements
Total included interviews	35	2,083 minutes (34 hours 43 minutes)

Source: Authors' analysis, 2026.

3.3. Data Collection, Transcription, and Ethics

Three interviewers conducted the semi-structured interviews in parallel from 2 to 6 March 2026, using the same protocol and case-summary form. Questions focused on how support first appeared, who interpreted it, what the firm tried, where the attempt stalled, how daily work changed, and what happened when technology failed. Follow-up probes clarified actors, decisions, sequences, consequences, and counterexamples. Field notes also captured machinery, storage, production sounds, connectivity problems, and other details that could be seen or heard during the sessions.

The interviews were transcribed using a clean-verbatim approach. Questions, spoken expressions, and relevant technical interruptions were retained, while fillers, repeated false starts, and pauses that did not change the meaning were not recorded systematically.

Quotations in Indonesian were translated into English by the authors and edited only for readability. P, K, and E refer to owner/manager, employee/internal informant, and ecosystem actor, respectively.

The Ethics Board of the Institute for Research and Community Service (LPPM), Universitas Sam Ratulangi, approved the study. Before each interview, participants were informed about the study, voluntary participation, confidentiality, and the use of anonymized quotations, and they gave informed consent. Transcripts and reported materials were redacted and anonymized to remove sensitive information about people, organizations, and businesses.

3.4. Data Analysis

The analysis began with a chronology for each MSME. It covered the first access episode, translation, experimentation, interruption, routine formation, and outcome. Participant Q&A was separated from interviewer memos before coding. The transcripts were then placed in a common evidence matrix and coded incident by incident. Early codes stayed close to the words and events in the interviews, such as "discipline in recording," "the knowledge stopped in my head," and "a system that must survive signal loss." The common codebook was revised as cases were compared. Literal codes were then grouped under mechanisms such as relational translation, selective recombination, delegation readiness, physical-digital bridging, implementation interruption, alternative resource mobilization, and performance-to-access feedback.

Cross-case matrices compared firms that received similar support but reached different outcomes, and firms that adapted despite limited formal access. During revision, the codebook and case matrix were checked again against the surrounding transcript passages. Interpretive differences were handled by returning to the case chronology, the wording of another role, and the shared code definition. We did not average disagreements or force every case into the model. A mechanism was kept when it could be traced to participant evidence and either recurred elsewhere or was clarified by a negative case. If the evidence remained uncertain, the claim was narrowed, marked as partial, or left out. No intercoder coefficient was calculated because the aim was interpretive comparison rather than independent classification.

The abductive journey was not a straight coding ladder. Early reading was guided by ecosystem access, resource orchestration, knowledge integration, and digital capability. The first working expectation was that broader formal support would usually make adaptation easier. The access-trapped cases unsettled that view because support was present but routines did not change. Resourceful adapters then showed that formal access was not always necessary; family, community, and local transport sometimes performed part of the conversion work. Hybrid routine embedding emerged from repeated physical-digital combinations in the cases rather than from an initial theoretical category. FC1 changed the model again. Until that case, routine formation looked like a reasonable endpoint. The outage showed that a routine could appear stable while knowledge and authority remained concentrated. This led to the fragile path and the continuity test used in Figure 1.

3.5. Outcome Evidence and Claim Boundaries

The outcome evidence was not uniform, so we separated three levels. First, some routines and artifacts were seen during fieldwork, including whiteboards, cards, machinery, storage arrangements, and records shown on a phone or device. Second, several accounts were corroborated across owners, employees, partners, or ecosystem actors. Third, some benefits came only from retrospective participant reports. The study did not collect a consistent archive

of contracts, loan approvals, waste records, or transaction files across all cases. We therefore use "observed," "corroborated," and "reported" carefully. We do not claim independently audited performance effects.

3.6. Research Quality and Reflexivity

Credibility was strengthened by comparing accounts within cases, interviewing people in different roles, testing negative cases, and keeping an audit trail from evidence to mechanism. The three interviewers used the same protocol and case-summary form, but their styles were not identical. One elicited longer narratives, one worked more systematically through the guide, and one probed contradictions more directly. We treated this as an interviewer effect. Leading probes and polemical field memos were not treated as evidence. Claims that appeared only after a strongly framed question were checked against less directed passages or another source before being retained.

Informant terms were kept separate from researcher-level concepts, and the model remained open to revision during comparison (Eisenhardt & Graebner, 2007; Gioia et al., 2013). The study was framed through economics and management questions about ecosystem support, operations, and digitalization. That lens carried an early expectation that broader access would usually make adaptation easier. The comparison challenged it quickly. Several access-rich firms made little operational change, while some firms with limited formal support adapted through local ties. FC1 also challenged the tendency to read a working digital routine as success. To avoid protecting the initial view, contradictory accounts were retained, owner narratives were compared with employees and ecosystem actors, and the team returned to case chronologies when interpretations diverged. Negative and deviant cases were used to revise the model, not explained away. We did not treat frequency as evidence of importance (Langley, 1999).

4. Results and Discussion

Table 4. Data Structure

First-order evidence	Second-order mechanisms	Aggregate dimension
"It was not technology; it was discipline in recording"; translating device output into stickers; a younger employee collecting manual data	Relational translation; selective recombination	Activating accessible resources
Whiteboards, cards, books, offline entry, visual guides, manual payment backup; inventory before promotion	Physical-digital bridging; back-end-first experimentation; hybrid redundancy	Embedding digital process change
Owner retains all decisions; no time or staff to experiment; machine exceeds electricity capacity; support ends after training	Owner bottleneck; operational slack scarcity; task–technology mismatch; program fragmentation	Interrupting resource conversion

First-order evidence	Second-order mechanisms	Aggregate dimension
Family tutorials; community supply; deferred payment; public-transport drivers as feeder network; customer feedback through messaging	Alternative resource mobilization; informal social infrastructure	Substituting for missing formal support
Reliable inventory supports contract discussions; transaction data may reduce credit uncertainty; dependable routines attract certification and mentoring	Performance-to-access feedback; credibility signaling	Regenerating ecosystem access
System works until network failure; knowledge stored in one device; employees lack route authority	Fragile embedding; concentrated operational knowledge	Boundary condition of apparent success

Source: Authors' analysis, 2026.

Table 5 shows how the model was built across all 13 cases. It is not a scorecard. The entries summarize the strongest evidence for each case. The core pathway is clearest in SC1–SC3. Resourceful adapters enter through informal ties. Access-trapped and constrained firms stop at different points. FC1 reaches apparent success but fails the continuity test.

Table 5. Mechanism-by-Case Evidence Matrix

Case	Translation / recombination	Experimentation / delegation	Embedding	Outcome evidence	Path shown
SC1	Whiteboard and mentor made recording workable.	Small two-week trial; roles shared.	Manual, offline, and digital records continued.	Artifacts observed; owner/employee reports; waste reduction reported, not audited.	Core pathway
SC2	Younger employee linked board entries to cloud inventory.	Owner allowed staged transfer and role sharing.	Board, cloud record, and visual guide worked together.	Owner, employee, distributor, and finance accounts corroborate reliability; no audited financial effect.	Core + feedback
SC3	Technical readings became color-coded production rules.	Owner carried the first administrative trial.	Rule repeated, but delegation remained limited.	Owner account and process artifact; performance not independently verified.	Core, partial delegation

Case	Translation / recombination	Experimentation / delegation	Embedding	Outcome evidence	Path shown
AT1	Training was understood but not linked to shipping and formalization.	Trial remained small and irregular.	No stable routine formed.	Owner/internal accounts; no sustained outcome.	Failure before embedding; recovery needs logistics and formalization support
AT2	No operational translator; employee had skill but little authority.	Equipment and online selling were tried separately.	Electricity and delegation problems stopped use.	Owner/former employee accounts; equipment mismatch described.	Failure at trial; recovery needs better fit and delegated authority
AT3	Digital cashier rules did not fit peak-hour work.	Real-time entry was attempted without enough training.	Staff returned to paper; records drifted.	Owner/employee accounts; cash discrepancies reported.	Interrupted trial; recovery needs a low-bandwidth workflow
RA1	A relative and online material helped adapt product knowledge.	Repeated small trials used local inputs.	A workable product routine formed.	Owner report; later certification and support reported.	Alternative entry + feedback
RA2	Family, customers, fishers, and drivers translated market needs.	Tasks were spread across the local network.	Informal supply and feeder logistics became repeatable.	Owner, worker, and partner accounts corroborate the routine.	Alternative entry + feedback
RA3	Online tutorials were turned into warehouse and card rules.	Staff tested the system after physical reorganization.	Cards and spreadsheet remained synchronized.	Owner/operator accounts; physical routine observed.	Alternative entry, strong embedding

Case	Translation / recombination	Experimentation / delegation	Embedding	Outcome evidence	Path shown
CF1	One-off support was not adapted to local maintenance and power.	No workable trial could be sustained.	No routine formed.	Owner report and equipment condition observed.	Blocked at activation; recovery depends on infrastructure and maintenance
CF2	Knowledge and market options were narrow.	Immediate cash needs left little room to test.	Collector dependence continued.	Owner and related actor accounts; no independent performance data.	Constrained path; recovery needs slack and market alternatives
CF3	Equipment and advice were understood only partly.	Repair cost and learning time interrupted use.	No distributed routine emerged.	Owner/internal accounts; equipment failure reported and observed.	Interrupted experiment; recovery needs repair and learning support
FC1	Digital tracking was installed and used.	The owner led the rollout but kept route authority.	Routine worked in normal conditions, not during outage.	Owner, employee, and platform accounts corroborate the breakdown; efficiency gain was reported.	Fragile path; stronger embedding needs distributed knowledge and authority

Source: Authors' analysis, 2026.

4.1. Relational Translation Makes Accessible Resources Workable

In the successful cases, conversion began before sophisticated technology was introduced. The first change was usually the translation of outside knowledge into a task that workers could understand and repeat. In SC1, batch recording started with a whiteboard and a two-week trial, not with software. The owner discussed the change with an experienced employee and linked recording to a small daily incentive. He associated the trial with less fish waste, although the amount was not independently audited. Looking back, he said that the turning point was discipline in recording, not technology (P-SC1). The digital application came later, after the manual practice had become credible to the workers.

SC2 showed the same mechanism in another form. Older production workers wrote weights on a large board, while a younger employee entered the data into a cloud inventory application. She put it simply: “I did not try to force them into my digital world. I just got their manual data and then digitized it” (K-SC2). Staff described the arrangement as less disruptive than direct entry by every worker. The owner also gained a clearer inventory record. Later, a visual guide allowed the owner to cover the employee’s role for a time. Translation was beginning to become organizational rather than personal.

SC3 showed the same process in a different form. A university-supported moisture meter was initially rejected by a roasting supervisor who relied on touch and taste. The owner translated the readings into red and green stickers placed on the coffee sacks, then entered the data on a laptop at night. The resource became useful only after it had been turned into a visual production rule and the administrative task had been reassigned.

The access-trapped cases show what happened when this mechanism was missing. AT1 understood the digital-marketing training but could not turn it into a workable selling routine because shipping costs, registration demands, and limited time were left unresolved. The owner said, "The knowledge never got to my business, it just stayed in my head" (P-AT1). AT2 received repeated training and modern machinery, but no one translated the support into a workable division of labor, an electricity upgrade, or a market sequence. The owner compared the intervention to "giving a luxury car to somebody who can't drive and can't afford the gas" (P-AT2).

These comparisons help mark the difference between knowledge integration and resource conversion. Not every employee had to become digitally competent. The firms needed an interface: a person, rule, artifact, or task arrangement that made specialized knowledge usable in the flow of work. Relational translation came before resource bundling. Yet translation alone was not enough. The firm also needed room to test the change and a way to keep it going after the translator stepped back. This extends the knowledge-broker role described by Crupi et al. (2020) from institutional intermediation to the receiving firm's daily work.

4.2. Hybrid Routines Support Digital Process Change

The second pattern was the use of mixed physical-digital routines. Successful firms did not replace manual work in one step. They built a link between embodied production knowledge and digital records. SC1 combined a notebook, offline data entry, and a dashboard. SC2 used a wall board, scheduled digital transfer, cloud synchronization, and a visual operating guide. SC3 used a measuring tool, color-coded stickers, and a nightly spreadsheet log. RA3 reorganized its physical warehouse before developing a spreadsheet system and required a physical barcode card whenever an item moved.

These manual elements were not simply leftovers that had to disappear. In several cases, they made the routine more resilient. During a power outage in RA3, cards and a manual log preserved the transaction sequence until the computer restarted. When QR payments were delayed, SC1 could still use cash. SC2 could continue recording inventory during poor connectivity and synchronize it later. The operational rule survived the technology failure because it was held in worker practice, physical artifacts, and digital records.

The cases also suggest a back-end-first sequence. Firms that sustained digital change usually began with inventory, batch recording, standard recipes, fulfillment, or payment reconciliation. Market-facing activity usually came after the operational base could provide reliable information. This differs from interventions that begin by opening a marketplace or social-media account. AT1 received product photographs and an online store, but shipping costs and administrative requirements blocked fulfillment. AT3 tried a digital cashier system during peak transactions, but connectivity delays were followed by double recording and cash discrepancies, and employees eventually abandoned it.

The findings are consistent with the argument that digital transformation changes interdependent processes rather than merely adding technology (Li et al., 2018; Plekhanov et al., 2023). They also offer a practical explanation for staged models of SME digitalization (Garzoni et al., 2020; Kahveci, 2025). Hybridization appeared to help adoption move toward

implementation when parallel records were reconciled and roles were clear. In the present cases, hybrid arrangements lowered skill demands and offered backup during failure. They also carried a cost. Double entry became a burden when the two records drifted apart.

4.3. Access Traps Emerge from Conversion Interruptions

No single deficiency was enough to explain the access traps. They appeared where several interruptions accumulated. The first was an owner bottleneck. In AT2, a younger administrator created an online catalogue, but the owner kept control over production priorities, distrusted platform escrow payments, and did not treat digital customer service as productive work. The employee had the technical skill but not the authority to act. In AT3, the owner blamed employees for avoiding real-time entry, while employees described a system that was too slow during peak transactions and had been introduced without enough training. Knowledge and authority were centralized, but they were not coordinated.

The second mechanism was limited operational slack. Microenterprise owners often understood the value of training but lacked the time, staff, or money to try something new. AT1 could explain digital marketing to neighbors, yet had no one to manage orders and no margin for shipping mistakes. The constrained firms faced an even tighter situation. CF1 gave up improved packaging because the trip to obtain it cost more than the packaging itself. In CF2, low literacy, weak connectivity, limited storage, and the need for immediate cash and transport made the firm dependent on a collector. One owner said, “We wanted to change, but we didn't know which door to knock on” (P-CF2).

Task-technology mismatch was the third mechanism. Equipment use broke down when electricity capacity, climate, repair access, spare parts, or user skills did not fit the intervention. In CF3, the owners struggled to keep production equipment running and had little room to stop daily work for learning. In AT2, the machine required more electricity than the workshop could supply. These were not minor post-adoption problems. They stopped the resource from entering the workflow.

Program fragmentation added to these interruptions. Government and incubator informants described success through attendance, certificates, equipment distribution, budget absorption, or loan repayment. Each indicator could be met while the recipient's process remained unchanged. One incubator manager admitted that institutions rarely asked whether equipment and credit had changed the way a firm produced. A banking informant said, “We don't finance participation in government programs; we finance operational order” (E-FIN1), but the bank itself monitored repayment rather than process change. Administrative measures were therefore separated from conversion: ecosystem actors reported program outputs while implementation problems remained inside the firm.

This evidence qualifies resource orchestration. Owners may not have the discretion, slack, or complementary assets assumed in an orderly process of bundling and leveraging. Conversion can be interrupted between any two stages, and the interruption may come from inside or outside the firm. Infrastructure matters, but not as a general stock of digital assets. It matters as a fit between a task and the conditions that support it. This also helps explain why antecedent-based models of digitalization may show uneven outcomes: resources, skills, strategy, and technology have to be assembled in a workable sequence rather than added separately (Eller et al., 2020; Radicic & Petković, 2023).

4.4. Informal Social Infrastructure Substitutes for Missing Formal Support

Resourceful adapters followed another route. They had little involvement in government or university programs, but they drew on family, community, online content, customers, and

local transport. RA1 learned product formulation from online videos with a relative, used local ingredients, and repeated experiments until neighbors returned to buy the product. Certification and institutional attention came later, after the business had gained traction. As the owner put it, "I did not wait for the program. I moved first, and then the program came to me" (P-RA1).

RA2 built a small value chain around a fishing community. A WhatsApp group coordinated catches, family members in other cities gave product feedback, and a younger relative opened an online store. Because formal couriers did not collect from the village, packages were entrusted to public-transport drivers who took them to an urban logistics office. Production was organized around this departure schedule. Community leaders confirmed that fish could be supplied on deferred payment and that local drivers worked as a trusted feeder system.

RA3 relied on online tutorials, an internally modified spreadsheet, physical warehouse discipline, and apprenticeship-style learning. It was not self-sufficient in any absolute sense. The firm still depended on freely available knowledge, family skills, devices, and markets. What stood out was its ability to mobilize those dispersed resources without waiting for a formal program to package them.

These patterns resemble bricolage, but they also have a relational and infrastructural side. The firms did more than make do with what was available. They built informal social infrastructure that carried some of the functions usually associated with formal ecosystem actors. Trust supported deferred payment, feedback, logistics, and information. This is consistent with evidence that social capital supports innovation through knowledge combination (Do et al., 2026) and that networks matter for resource-constrained SMEs (Vu et al., 2023). It also extends bricolage research by showing how local relationships can feed into formal digital and logistics systems rather than simply replace them (Baker & Nelson, 2005; Flaminiano, 2024).

4.5. Adaptive Outcomes May Open Renewed Ecosystem Access

The final mechanism was recursive, but the evidence needs a careful reading. In SC2, the owner and distributor linked daily inventory records to more confident ordering. A financial informant separately explained that consistent transaction and inventory records can reduce uncertainty in cash-flow lending. These accounts point in the same direction, but the study did not collect the contract or loan file as independent proof. The important signal was not digital visibility by itself. It was disciplined data that could be reconciled with operations.

RA1 and RA2 described a similar sequence through different channels. The owners connected reliable products and repeat demand with later certification support, academic interest, and wider market links. Those later outcomes were reported rather than independently audited. Even so, the cross-case pattern was consistent: a firm that could show dependable work appeared more credible to outside actors. Performance did not replace ecosystem access. It changed the firm's position when partners had enough reason to trust the routine.

This feedback pattern is consistent with process accounts of entrepreneurial ecosystems. Wurth et al. (2023) distinguish upward and downward causation, while Spigel and Harrison (2018) emphasize ecosystem evolution. The present evidence suggests a plausible organization-level pathway: operational consistency may build credibility, and credibility may alter partner expectations. Finance, contracts, or institutional support may follow. Because the evidence is retrospective, renewed access is treated as a possible feedback outcome, not as a proven performance effect.

4.6. Conversion Governance and Program Redesign

The ecosystem-actor interviews also show that conversion is a governance challenge. University incubators that placed facilitators inside firms for several months could observe confusion, adjust the tools, and help assign roles. Agencies working through short courses and equipment distribution had much less information about what happened after delivery. Government officials spoke openly about pressure to report budget absorption, participant numbers, and distributed units, while also acknowledging limited resources for follow-up visits.

This points to a missing layer of governance between provision and performance. Neither the provider nor the firm consistently owns the conversion process. A trainer may explain a tool, a government office may purchase it, a bank may finance it, and a platform may accept the seller, yet no one is responsible for aligning electricity, workflow, staffing, logistics, and customer response. Fragmentation is therefore more than institutional duplication. It is also a lack of accountability for implementation across boundaries.

The data suggest that conversion governance needs to be staged. First, the MSME and facilitator identify a concrete operational problem. Second, they agree on a workable artifact, task, and responsible person. Third, a small experiment is observed under normal and high-pressure conditions. Fourth, the routine is tested when the owner, facilitator, internet connection, or main device is unavailable. Only then is there reasonable evidence that the intervention has contributed to capability development.

This interpretation extends ecosystem research by locating coordination not only between organizations, but also between stages of implementation. One practical sign of ecosystem quality is whether support actors can maintain continuity from resource provision to routine formation. No institution has to do everything. The important point is that hand-offs preserve the operational problem, the learning already gained, and responsibility for the next conversion milestone.

4.7. Integrative Process Model and Boundary Conditions

Figure 1 brings the paths together as a dynamic framework, not a ladder. The solid line shows the core pathway: access, relational translation and recombination, delegated experimentation, hybrid embedding, and adaptive operational change. Translation and experimentation may overlap. A firm may also return to an earlier problem when a trial exposes poor fit. The dashed lines show alternative entry, interruption, and fragile embedding. Recovery is not treated as one fixed route. The note below the model signals that firms may pause, reverse, or re-enter the core path when fit, delegation, or continuity problems are addressed.

The boundary conditions operate as a layered set rather than as isolated variables. A severe task-technology mismatch, or the absence of basic power and repair, can block activation before a trial is sensible. When minimum fit exists, operational slack and delegated authority shape whether experimentation can happen. During embedding, distributed knowledge, data continuity, and maintenance become more important. The conditions can compensate for one another only partly. A manual fallback may soften unstable connectivity, but it cannot correct a machine that exceeds electrical capacity. Owner commitment may start a trial, but it cannot make the routine durable if no one else has authority.

The paths are not permanent categories. An access-trapped firm may move toward the core path if a translator resolves operational fit and the owner delegates a bounded trial. A resourceful adapter may enter formal support later without starting again, as the RA cases suggest. A fragile converter may strengthen embedding by distributing device access, route

knowledge, and outage authority. Movement can also reverse when a key person leaves, records drift, or infrastructure fails. Renewed access may reopen the process with better resources or stronger bargaining power, but it does not guarantee that conversion will hold.

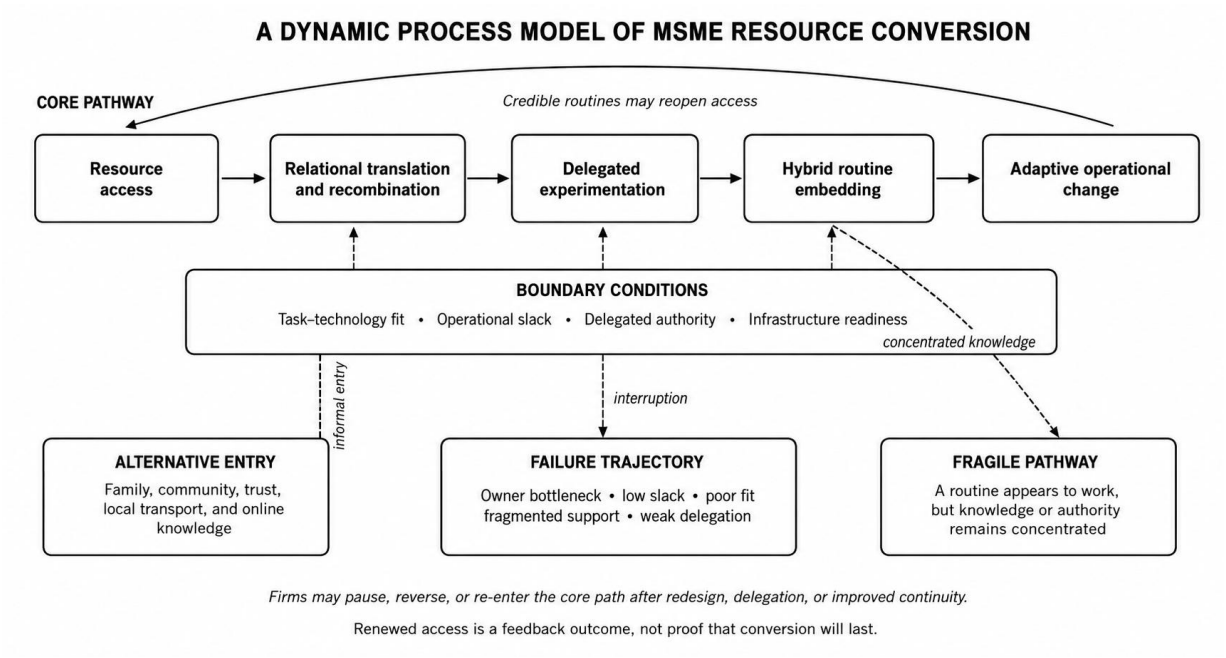
The context shapes the form and intensity of these movements. In the four provinces studied, inter-island logistics, uneven electricity and connectivity, thin repair services, and limited post-program follow-up made hybrid routines and local feeder networks especially visible. Those forms are context-dependent. The underlying questions may travel more widely: can the resource be translated into local work, is there room and authority to test it, does the task fit its supporting conditions, and can the routine continue without one person or device?

Table 6. Cross-Case Conversion Configurations

Configuration	Access–conversion pattern	Dominant mechanisms	Observed trajectory
Successful converters	Formal access translated into simple tasks and delegated roles	Hybrid routines, visible operational feedback, distributed responsibility	Reliable processes; renewed finance or market access was reported or corroborated in some cases
Access-trapped firms	High exposure to training/equipment but weak conversion	Owner bottleneck, low slack, formalization barriers, task–technology mismatch	Return to old routines or symbolic adoption
Resourceful adapters	Low formal access but active mobilization of dispersed resources	Bricolage, family/community knowledge, informal logistics, direct market feedback	Adaptation was followed by selective formal recognition
Constrained firms	Limited access and limited capacity to compensate	Structural dependency, low literacy, repair/logistics barriers, immediate liquidity pressure	Persistent low bargaining power and narrow choices
Fragile converter	Digital process initially appeared efficient	Knowledge concentrated in device/manager; no outage protocol or delegated authority	Reported efficiency disappeared during infrastructure interruption

Source: Authors' analysis, 2026

Figure 1. A Dynamic Process Model of MSME Resource Conversion



Source: Authors' analysis, 2026

5. Conclusions and Recommendations

5.1. Conclusions

Across the cases, the important issue was not simply whether support was available. It was whether the firm could bring that support into daily work. Outside knowledge became useful when someone translated it into a workable task, when the firm had room to try, and when the routine could continue beyond the first effort. Hybrid physical-digital arrangements often helped. They were useful because skills and infrastructure were uneven, not because two systems are always better than one.

Conversion failed for different reasons. Sometimes the technology did not fit the work. Sometimes daily demands left no room for learning. In other cases, program actors stopped at delivery or owners kept knowledge and authority to themselves. Apparent success also remained fragile when one person or device held the operating knowledge. Limited formal access did not always lead to failure. Families, communities, customers, and local transport could supply knowledge, trust, finance, and logistics. Those arrangements helped, but they also brought dependence and uneven accountability.

5.2. Theoretical Contributions

Resource conversion is not proposed as another broad capability label. It names a narrower process between access and a repeatable routine. In this dataset, sustained conversion involved three linked mechanisms: local translation and recombination, delegated experimentation, and routine embedding. Resource orchestration describes the broader managerial task. Absorptive capacity and knowledge integration explain learning. Dynamic capabilities explain higher-order adaptation. Bricolage explains improvisation under constraint. Resource conversion overlaps with these ideas, but its empirical boundary is different. It asks whether one reachable input becomes workable, shared, and able to continue in ordinary operations.

The model also separates mechanisms from outcomes. Adaptive operational change is the first outcome that can be seen in the firm. Renewed access is later and less certain. Informal social infrastructure offers an alternative entry, while interruption and fragile embedding explain why access may be followed only by symbolic use or short-lived improvement. The mechanisms may transfer to other resource-constrained settings, but their form need not. In these four provinces, inter-island logistics, unstable infrastructure, thin follow-up services, and local trust shaped the tools and relationships through which conversion was attempted. Elsewhere, the same questions may appear through different artifacts or networks.

5.3. Practical Recommendations

Government agencies should look beyond delivery counts. Funding and reporting can include a few conversion milestones: a real process problem has been selected, a responsible person has enough authority, a small trial has been observed, and the routine has continued after the facilitator leaves. Equipment programs also need checks for power, repair, spare parts, and maintenance responsibility.

University incubators should stay close to early implementation. Their most useful role may be field translation: helping the firm adapt a tool, assign work, and notice what fails during ordinary and high-pressure periods. Before the program closes, the incubator should leave a clear hand-off, a fallback procedure, and a simple test of whether the routine can continue without the mentor.

Financial institutions should separate program participation from operational readiness. Records that can be reconciled with stock, orders, and cash flow may be more informative than a certificate or a marketplace profile. Small financing steps can also be tied to maintenance capacity and the stability of the routine rather than to digital visibility alone.

Digital platforms and logistics providers should design for low-bandwidth and interrupted settings. Offline capture, simple data export, clear exception handling, and links with trusted local feeder transport can matter as much as front-end promotion. Providers should also make it easy for more than one authorized user to access critical information.

MSME owners should treat delegation as part of conversion. Device access, data, and decision rights need to be shared enough for the routine to continue during absence or outage. Manual and offline backups can remain useful, but they have to be reconciled. The owner should also test whether another person can run the process before calling the change embedded.

Table 7. Decision Rules for Hybrid and Informal Arrangements

Arrangement	Maintain when	Upgrade when	Formalize, integrate, or replace when
Hybrid manual-digital records	Keep when the manual layer is a real fallback and both records are reconciled.	Upgrade when double entry adds delay or frequent correction.	Replace or integrate when records drift, audit becomes difficult, or transaction volume exceeds manual capacity.
Informal logistics and local feeders	Keep when service is reliable, responsibilities are understood, and formal carriers do not reach.	Add hand-off logs, contingency contacts, and simple service standards.	Formalize when scale, regulation, insurance, or customer risk can no longer be handled informally.

Arrangement	Maintain when	Upgrade when	Formalize, integrate, or replace when
Family and community knowledge	Keep when knowledge is shared and access is not limited to one person.	Document key tasks and widen participation beyond close relations.	Formalize when dependence is associated with exclusion, conflict, or continuity risk.
Owner-led digital routines	Keep during the first trial when the owner is learning with staff.	Share device access, data, and decision rights; test absence and outage.	Redesign when the firm stops whenever the owner or one device is unavailable.

Source: Authors' analysis, 2026.

These stakeholder roles make follow-up more specific without assuming that every firm needs the same formal solution. Operational fit, delegation, data continuity, maintenance capacity, fallback procedures, and exit readiness can be checked in simple ways. The point is not to remove local arrangements too early. It is to know when they are carrying the process, when they need support, and when they have become the next source of fragility.

5.4. Limitations and Future Research

The evidence has limits. Interviews were concentrated in a short period, while participants recalled events that had unfolded over several years. Some routines and artifacts were seen during fieldwork, and several claims were checked across roles. Documentary records were not collected in a consistent archive, however. Claims about waste, reliability, finance, and market gains are therefore distinguished as observed, corroborated, or participant-reported. The case configurations are analytical rather than population categories, and four provinces cannot represent every peripheral setting in Eastern Indonesia. The study also reconstructs processes retrospectively rather than observing implementation over time.

Future research could follow a firm from the receipt of support through experimentation and routine formation. It could also compare field translation with classroom training or test the identified configurations through qualitative comparative analysis. Two questions remain open: when does hybrid redundancy strengthen a firm, and when does it become costly duplication? How can informal feeder networks be linked to formal finance and logistics without weakening the trust on which they depend?

Statements and Declarations

Ethical approval: Ethical approval was granted by the Ethics Board of the Institute for Research and Community Service (LPPM), Universitas Sam Ratulangi.

Informed consent: All participants received information about the study purpose, voluntary participation, confidentiality, and the use of anonymized quotations. Informed consent was obtained before each interview.

Conflict of interest: The authors declare no conflict of interest.

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Data availability: The interview transcripts are not publicly available because they contain potentially identifying operational and community information. Anonymized excerpts may be made available by the corresponding author subject to ethical and confidentiality restrictions.

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