

Productivity, quality and learning

PRODUCTIVITY MAPPING FOR THE GLOBAL CARPET SECTOR

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Measure quality, capability, earnings and learning together. More area per hour is not automatically better performance.

Evidence and interpretation

Reference: David Atkin, Amit K. Khandelwal and Adam Osman (2017), Exporting and Firm Performance: Evidence from a Randomized Experiment, Quarterly Journal of Economics 132(2), 551-615, doi:10.1093/qje/qjx002. Publisher record: <https://doi.org/10.1093/qje/qjx002>.

The experiment concerns small rug producers in Fowa, Egypt. Its central measurement lesson is to distinguish changes in specifications and quality from changes in technical efficiency. The main analysis covers 219 duple producers; eligibility and take-up differ from that analysis denominator. Research effects are not COTO results or forecasts. The design below is an original COTO proposal, not a reproduction of the paper's instrument.

Purpose and unit of observation

Build a voluntary, longitudinal map of production capability, constraints, quality, financial outcomes and learning. Link country > region > cluster > business/site > technique/specification cohort > order/lot > production stage. Public output is a coarse aggregate; exact home-work locations and personal records remain restricted. Cover hand-knotted, hand-tufted, flatwoven and machine-made production as separate techniques, with locally reviewed subtypes. Never rank their raw speeds against one another.

Comparable specification record

Freeze specification version before observation: construction, fibre/yarn composition, dimensions, density where relevant, pile height, colour count, design complexity rubric, finishing, target tolerances, equipment and material grade. Record changed scope rather than treating all square metres as equivalent. Cohorts need enough comparable observations to report; otherwise label insufficient data. Do not infer skill from geography, gender, caste or ethnicity.

Measure comparable production

1. Physical throughput

completed area in square metres / direct production person-hours for the same batch and period. Include all participating production labour, including declared family/unpaid contributions where lawful, without normalizing unlawful labour. Report paid/unpaid coverage and missing hours; never turn missing time into zero. Record completed, accepted and reworked quantities separately.

2. Accepted throughput

accepted area / total direct production and rework person-hours allocated to that batch. Keep unfinished work and inspection lag explicit. Never divide this month's shipments by an unrelated month's labour.

3. First-pass acceptance

area accepted at first inspection / area inspected at first inspection, with a fixed unit basis. Partial acceptance, sampling scope and pending inspection are explicit.

4. Rework intensity

rework person-hours / total direct production plus rework person-hours. Do not double-count rework within the denominator.

5. Quality

construction-specific independent rubric, with original measurements, tolerances and assessor confidence. Examples: dimensional accuracy, design fidelity, flatness, edge/corner finish, colour consistency and technique-appropriate integrity. Agree the rubric with craftspeople and buyers; do not copy flatweave criteria unchanged into tufted or knotted products. Preserve component results rather than hiding all failures in one score.

Measure value and information

6. Delivery performance

orders delivered by the agreed current deadline / eligible delivered orders; also report original-deadline performance and amendment count. Show order count and size-weighted exposure separately.

7. Material yield

measured usable output material / measured input material within a defined transformation and unit. Reconcile stock, waste, returns and recoverable scrap; area and mass are not interchangeable.

8. Economics

sales, recognized costs, operating surplus and cash collected as distinct dimensions. Specify accounting period, inventory movement, overhead and owner-labour treatment. For comparability report operating surplus before owner-labour imputation and a separately stated imputed-labour scenario. Do not call revenue per hour technical productivity or claim gross trade value as platform revenue.

9. Producer outcomes

agreed versus credited/available payment, payment delay, safe participation and remedy outcomes under restricted review. Local payroll and source records retain their lawful currency; USD reporting uses documented exchange-rate source/date. Real comparisons disclose inflation and FX basis.

10. Information latency

buyer issue raised to producer receipt, understood instruction, approved sample, corrected production and independently checked outcome. Delivery of a message is not learning or resolution.

Turn feedback into learning

Baseline and learning cycle

Obtain informed participation and compensate extra sample work appropriately. Establish at least one complete production-cycle baseline, extending observation for long-cycle goods; a calendar month alone may be inadequate. Follow comparable batches over repeated cycles. A proposed 12-week feasibility window may validate data collection but cannot guarantee statistical power or finished hand-knotted orders.

Buyer feedback -> safe/local-language explanation -> producer acknowledgement and clarification -> demonstrated technique/sample -> authorized production revision -> blind quality review -> outcome feedback. Record coaching topic, date, time/cost, adoption and subsequent corresponding quality dimension. Pay for learning time under agreed terms; do not turn assessment into an unpaid production quota.

A voluntary compensated standard-sample exercise using equivalent inputs, equipment and agreed specs helps distinguish product-mix changes from within-spec improvement. Use anonymized assessor IDs and an independent second review of a sample. Assessors disclose conflicts; producers can correct records and appeal.

Proposed implementation sequence

Prepare: assign owners, agree cohort/specifications, permissions, review rubric and baseline. Capture: reconcile complete production cycles and source records. Review: compare within specifications and examine feedback adoption. Publish: approve only appropriately aggregated, qualified results with coverage, denominator and period.

Worked arithmetic - synthetic only

Two people each work five hours, followed by two additional person-hours of rework. Total effort is 12 person-hours. If 6 square metres are accepted, accepted throughput is 0.5 square metres per person-hour. Compare it only with a suitably similar specification and quality requirement; this is not a sector benchmark.

Evidence, people and technology

AI and blockchain roles

Start with validated arithmetic and stratified descriptive trends. AI may extract source forms, translate feedback or suggest anomaly checks after representative evaluation and permissioned data processing. Any specification-adjusted statistical estimate must disclose variables, sample, uncertainty, validation and sensitivity; do not label an arbitrary score TFP. Sparse cohorts require restraint. No individual worker ranking, wage reduction, coercive quota or exclusion based on a model.

Keep source records and detailed measures in a permissioned database/evidence store. A future ledger may anchor approved specification versions, batch evidence packages, assessor attestations and correction links with approved privacy controls. Preserve declared, document-checked and independently assessed statuses. A hash proves neither hours worked nor rug quality; actual source review and inspection remain essential. No blockchain or AI service is enabled by this document.

Accountability and publication

Producer/site reporter submits source records; trained enumerator helps with accessible capture; qualified independent assessor checks quality; finance reviewer reconciles economic/payment evidence; data steward checks denominators, permissions and corrections; an independent appeal contact handles disputes. These are roles to staff, not appointments already made.

Monthly internal review checks missingness, duplicated batches, units, total hours, inspection pending and inconsistent revisions. Publish only privacy-reviewed cohort aggregates with geography, technique, period, denominator, coverage and assurance status. Set a justified minimum cohort and dominance/re-identification suppression policy before publication; a fixed count alone is not sufficient protection. Do not publish personal wages, named worker scores or exact household locations.

Test before publishing results

Evaluation and release tests

A before/after gain is descriptive, not causal proof. An impact study needs a pre-specified comparison design, ethical consent, power/sample planning and analysis of non-take-up, attrition, spillovers and changing product mix. Randomized or phased access may be considered only with research/operational review and no withholding of rights, pay or essential support. Include acquisition, coaching, review, logistics, rejection and coordination costs when assessing commercial viability; the research does not prove COTO's business model.

Required tests: two workers for five hours produce ten person-hours; rework is counted once; specification change starts a new cohort/version; pending inspections are not failures or acceptances; duplicate batches cannot inflate output; missing hours yield unavailable productivity; superior craftsmanship with slower speed is not automatically labelled poor performance; FX and inflation changes cannot masquerade as technical gains; assessors cannot certify their own disputed result; small-cohort exports are suppressed.

Commercial use

Proposed subscription dashboards and scoped capability assessment can help buyers plan realistic orders, producers identify support needs and clusters target training. Disclose fees and underlying sample limitations. Do not sell favourable rankings or gate orders solely through a score. Source-data access remains controlled, and producers receive understandable feedback and corrections. Measure the full cost of assisted participation and independent review before setting a USD tariff.

Present status

This is a measurement and implementation specification with a blank capture template. No sector dataset has been collected or validated, no live productivity map exists, and the Egyptian study is not evidence of COTO customer outcomes. AI and public blockchain services remain in development. Read alongside COTO service disclosures and applicable completed agreements.

Reference and scope

Research reference: Atkin, Khandelwal and Osman (2017), *Exporting and Firm Performance: Evidence from a Randomized Experiment*, QJE 132(2), 551-615. [doi:10.1093/qje/qjx002](https://doi.org/10.1093/qje/qjx002). COTO workflows, measures and release controls in this guide are proposed adaptations, not the authors' survey instrument or endorsement.